DX700T

MONITOR SERVICE GUIDE

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Chapter One : Introduction to the RMA System

1. *How to apply for an RMA*

All normal repairs are resolved through the Technical Marketing Department of MAG in Taiwan or MAG's local service centers. In order to track returned products, the Technical Marketing Department and local service centers must issue an RMA (Return Material Authorization) number to the customer whether the product is within the warranty.

2. *Required Information When Applying for an RMA*

In order to obtain warranty service, the product must be delivered with:

A. Model number
B. Serial number
C. Manufacture date
D. Error code

3. *Warranty*

i Limited Warranty

MAG warrants MAG products against defects in material and workmanship for a period of time for parts and labor according to the contract agreed by MAG and the customer. MAG will repair or replace at its option, the product and any of its parts which fail to conform to this warranty during the term of the warranty. MAG may replace or repair the product using new or refurbished parts. All replaced parts belong to the property of MAG.

All warranty repairs must be performed by MAG authorized repair centers.

ii Exclusions

This limited warranty does not cover the repair of cracked, scratched, broken or modified plastics or other cosmetic damage which includes altered, defaced, or removed parts and scratched CRT. An invalid warranty is described as below:

- **Misuse**

The limited warranty does not apply to improper maintenance, misuse, neglect, incorrect line voltage, phosphor burns, impurity problems, and operation contrary to furnished instructions. (Aging CRT may reduce focus and result in bad luminance characteristic of the monitor; CRT phosphor burns are caused by operating at excessive brightness levels for extended periods; and impurity problems may result from monitor mishandling.)

- **Faulty repair by customer**

The limited warranty does not apply to repairs or replacement necessitated by any cause beyond the control of MAG including, but not limited to, any malfunction, defects or failure which in the opinion of MAG are caused by or resulting from unauthorized service or parts.

- **Poor Packaging**

In order to obtain warranty service, the product must be delivered in its original package or an equivalent (to avoid shipping damage). The limited warranty does not apply to damage caused by poor packaging and shipping.

4. *Repair Routine*

i Before Repair

* When you unpack an RMA monitor, check for poor packaging. Sometimes poor packing causes poor purity of CRT, a broken bezel or broken housing.
* Remove the housing and check the set for damage by the customer's misuse or faulty repair.
* If the RMA monitors are treated with wrong way described above, please stop repairing and inform your supervisor to deal with customers.

ii Repairing

* Fix the set according to the Error Code and error description from user.
* If you cannot immediately find the problem, run the set's burning-in test and check again.
* Replace the defective components with MAG standard spare parts. Except for those recorded in the Engineering Change Notice (ECN), do not try to change the value of the resistors, capacitors, or other components to a number different from the original setting.
* In the process of repairing, please put the important Engineering Change Notice (ECN) on all RMA sets. The important ECN has solutions to specific potential defects. Make sure ECN components are added to the RMA set to avoid returns with the same problem.

iii Alignment

Input MAG primary timing and pattern to align H-size, H-phase, V-size, V-position, V-linearity, white balance, focus and convergence. Then check every preset timing to confirm they are within the customer specifications.

iv Burn-in Test

* All finished RMA sets should go through a 24-hour burn-in test. The inspector will check the monitor's performance according to the specifications afterwards.
* If the set failed to pass the inspection, return it to the technician again.

v Refurbishing

* Clean the outside of the monitor with a non-alcoholic cleaner. (Alcoholic cleaners make silk-screen colors fade). Renew the polystyrene and carton.

MAG service policy for handling the impurity problem

CRT is the most significant and expensive part of the monitor. Most disputes are CRT related, especially on impurity. Many CRT problems were resulted from mis-handling or freight damage during transportation. MAG is very concerned of the issue, and sincerely hope that we can help to solve the problem and to avoid the incidence from happening again.

Here are our suggestions:

* Buy local insurance as MAG is doing on trucking transportation to cover those damages.
* Use the original packing material to return the RMA goods.

MAG's packing material is able to pass the drop test height of 76cm in normal transportation and handling.

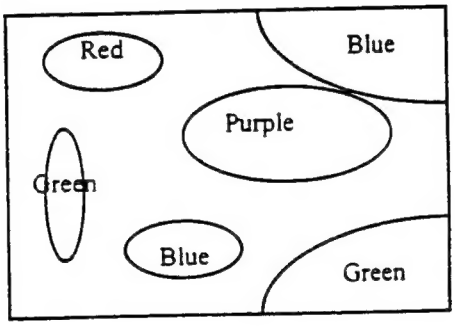
RMA goods received with any of the following situations is assumed to be customer's liability.

Rule 1: Judge from the appearance

1. Broken bezel/housing
2. Broken carton/polystyrene
3. Scratched CRT
4. Broken CRT
5. Not using MAG original or equivalent packing.
6. CRT phosphor burnt at fixed pattern for extended period.
7. Unauthorized modifications or partially repaired by customers

Rule 2: Use a demagnetiser to determine whether the color mask is damaged

1. Impurity which can be degaussed by a demagnetiser is treated as within warranty
2. Impurity which CANNOT be degaussed is treated as out of warranty
3. Using figure 1 to check impurity. If there are irregular impurity color blocks on the screen, it will be treated as out of warranty.



LOCAL #RMA REPAIR REPORT

No	Customer	RMA No.	Model	Series Number	Manu Date	Receive Date	Error Code	Sub Code	Sub Description	Remarks
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										

Checked By : ___ _ ___ Repaired By : _____ Fixed Date : _____

Chapter Two : Controls & Functions

1. *Information About the Timing (Resolution) Setting*

For optimal timing/resolution and eliminate improper adjustments, this monitor will automatically set the timing to the factory setting. If the user rather prefer to use their own customized timing settings the "User Mode" can be used. By using the "Recall" function, the monitor will return itself to the proper automated factory resolution settings.

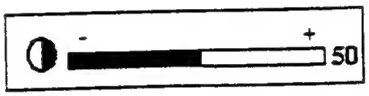
2. *Basic Controls*

i **Power Button**

Power On and Off the DX700T. There will be a 2 second delay before a display appears. The Power LED will (next to the power button) light up when the power is switched ON.

ii **Contrast Control**

The DX700T features a hot key which enables the user to control the contrast without ever going into the OSD main menu. When the Contrast Adjusting button is pressed, the OSD Contrast control bar (as shown in the scale bar below) will appear on the screen.



3. *OSD Controls*

There are four OSD (On Screen Display) menus available, the Main Menu (for basic geometric adjusting), the Advanced Functions, the Color Manager and the OSD Manager.

i **Menu Button (**  **)**

Use this button to enter one of the 4 OSD Menus.

ii **Select Buttons (< or >)**

Use < or > to select the desired item for adjustment.

iii **Adjust Buttons (+ or -)**

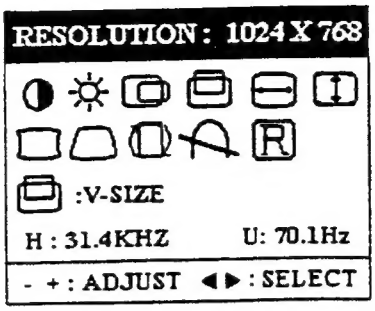
Use the button to adjust the selected item.

4. *How to Adjust Other Visual Settings*

Step 1: Press the menu button to select the OSD menu you wish to adjust.
Step 2: Press the select button (< or >) to select the item you wish to adjust.
Step 3: Adjust the selected item by using the Adjust button (+ or -).
Step 4: To save the new adjustment, press the menu button continuously until the OSD disappears from the screen. If no button is pressed within 8 seconds, the displayed OSD menu will disappear and your new adjustments will be saved automatically.

5. *Description of Each Menu & Control*

i **The Main Menu**



The main menu is to control all basic geometric screen adjustments. Press the menu button to enter the Main Menu. There are 10 modes in this OSD menu.

a. Contrast ( ): Increases and decreases the contrast of the display.

b. Brightness ( ): Increases and decreases the brightness of the display.

c. H-phase ( ): Shifts display horizontally.

d. H-size ( ): Increases and decreases the horizontal size (width) of the display.

e. V-position ( ): Shifts the display vertically.

f. V-size ( ): Increases and decreases the vertical size (height) of the display.

g. Pincushion ( ): Alters the vertical edges of the display to bend the image inward or outward.

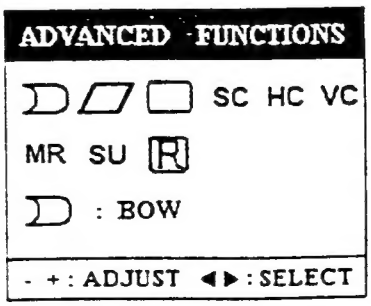
h. Trapezoid ( ): Adjusts the trapezoid distortion.

i. Rotation ( ): Adjusts the tilt of the display.

j. Degauss ( ): Manual degauss of the CRT.

k. Recall ( ): Recalls all geometry controls to the optimal pre-programmed (factory) setting.

ii **Advanced Functions**



Press the menu button twice to enter this menu. There are 9 modes in this OSD menu for adjustments.

a. Bow ( ): adjusts the horizontal balance distortion.

b. Parallelogram ( ): adjusts the parallelogram distortion.

c. Corner ( ): adjusts the corner distortion.

d. S-curve (**SC**): adjusts the S-curve distortion.

e. Hor-convergence (**HC**): adjusts the CRT horizontal convergence.

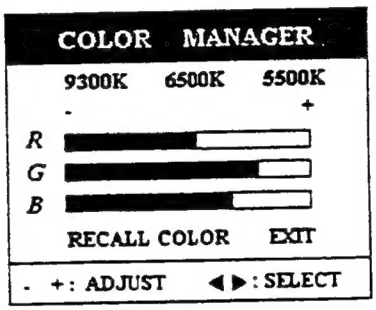
f. Ver-convergence (**VC**): adjusts the CRT vertical convergence.

g. Moire (**MR**): allows user to minimize moire interference pattern.

h. Save User Mode (**SU**): allows user to store display settings for a custom User Mode.

i. Recall ( ): recalls all Advanced Functions to the optimal pre-programmed (factory) settings.

iii **Color Manager Menu**



There are three preset color temperature modes (9300°K, 6500°K, and 5500°K), and three user color modes.

iv **How to select a color mode?**

Use the Select buttons to choose the desired color mode. The selected color mode will be highlighted in red.

v **How to adjust a user color mode?**

Step 1: Select R, G, or B to begin adjusting. The selected color's letter will be in Magenta.
Step 2: Use the Adjust buttons to adjust the selected video gain.

Red Control (R) increases/decreases the red video gain level.
Green Control (G) increases/decreases the green video gain level.
Blue Control (B) increases/decreases the blue video gain level.

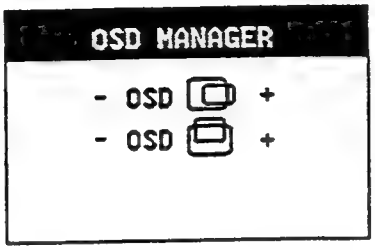
vi **Exit**

To exit the Color Manager Menu, please follow the steps below:
Step 1: Press the Select buttons, and select Exit
Step 2: Press the Adjust buttons to confirm the selection. The cursor will exit with the selected user color mode.

vii **How to recall the preset factory Color Temperature Mode?**

Step1: Select Recall Color
Step 2: Press the Adjust buttons to recall the preset color temperature modes.

viii **OSD Manager Menu**



To adjust the OSD Manager Menu:
Step 1: Press the Select buttons to select the desired item for adjustment. The selected item will turn yellow.
Step 2: Press the Adjust button to confirm the selection, and begin adjusting. The selected item will then turn magenta.
Step 3: Repeat step 1 - 2 to make other adjustments if necessary.

Description of each control

a. H-position ( ): shifts the OSD menu left or right.

b. V-position ( ): shifts the OSD menu up or down.

ix **Programming the DX700T**

DX700T has 18 preset modes. If the current video mode is one of the preset modes, the DX700T will store the adjustments automatically into the permanent memory. In addition, the DX700T offers 8 user modes that allow the user to save the display characteristics of any video mode that is not a preset video mode.

To store a User Mode:
Step 1: Enter OSD Main Menu
Step 2: Select **SU** icon.
Step 3: Press the Adjust buttons to save the current video mode as a user mode. When assigning the 8 user modes, a FIFO (First In First Out) order is applied. That means, if you have saved 8 user modes, the next mode programmed will overwrite the first one.

Chapter Three : Engineering Specifications

1. ELECTRICAL PERFORMANCE

This document defines the performance requirements for a 17 inch, Sony Trinitron™ tube monitor, and two versions of synchronization timings:
Universal Version Timings: 31kHz to 70kHz
Japanese Version Timings: 24kHz to 70kHz

All items must be performed under " standard test conditions " unless otherwise specified.

1.1 STANDARD TEST CONDITIONS

- Warm up time: 30 minutes
- Face east
- User or automatic degaussing
- AC supply voltage: 90~264 Vac, 48~62Hz
- Ambient temperature 25°C +/- 5°C
- Humidity: 10 - 90 %
- Display mode: 1024 x 768 @75 Hz (Primary mode)
- Background raster is set to 0.7 ± 0.5 FL.
- Light output for full white: 35 FL Max. (ABL).
- Center window: windows size ≤ 1/8 screen size
- Input signal: 0.7 Vpp
- External controls for picture geometric and position: Preset position
- Video generator: Chroma 2135 or equivalent

1.2 CRT DESCRIPTION

- Manufacturer: Sony Trinitron Tube, 90 degree deflection
- 0.26mm strip, anti-glare, anti-static, anti-reflection
- Size : 17"

1.3 POWER SUPPLY

1.3.1 AC INPUT RANGE

- Voltage: 90 - 264 Vac universal
- Frequency : 48-62 Hz

1.3.2 POWER CONSUMPTION

< 130 W at the specified voltage and frequency range

1.3.3 LEAKAGE CURRENT

1.5 mA max. at 120 Vac
3.0 mA max. at 230 Vac

1.3.4 INRUSH CURRENT

For 110 Vac input: 35A max. at cold start
For 230 Vac input: 70A max. at cold start

1.3.5 POWER LINE SURGE

No loss of information or defect with a maximum of 1 halfwave missing per second

1.3.6 POWER ON DEGAUSS

After powered on , the monitor will performs an automatic degauss to insure chromaticity requirements if powered off more than 60 min.

1.4 ELECTROSTATIC DISCHARGE

9KV(500PF + 100 Ω) without failure

1.5 HIGH VOLTAGE

26.5KV ± 1KV typical (at cut-off)

1.6 X-RAY PROTECTION

Operation of CRT is only allowed inside the CRT specification.
The X-ray protection circuit checks the flyback voltage and shuts down the horizontal stage in any case of a too high voltage.

1.7 RETRACE TIME

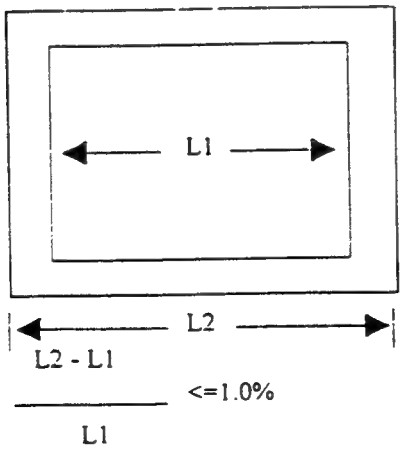
- Horizontal: 2.85 us typical
- Vertical: 350 us typical

1.8 PICTURE SIZE

Primary Mode	Other Modes
300 ± 5mm	300 ± 10mm
220 ± 5mm	220 ± 10mm

Full size scan shall be capable for all Preset modes.
(Except 1024 x 768 35kHz before Q4-1996)

1.9 RASTER REGULATION (for all modes)



300 x 220 mm

L1 = Picture width at brightness 5FL.
L2 = Picture width at brightness 35FL

1.10 PROTECTION CIRCUIT

- Missing or improper sync pulses will not damage the monitor
- Spot suppression circuit

1.11 PULL IN FREQUENCIES

	Universal Version	Japanese Version
- Horizontal range:	30KHz -70KHz	24kHz - 70kHz
- Vertical range:	50Hz - 150Hz	50Hz -150Hz

1.12 VIDEO BANDWIDTH

-100 MHz (-3dB) nominal

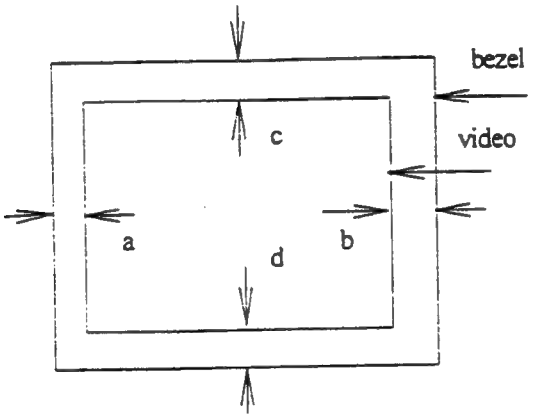
1.13 INPUT SIGNAL

Analogue Input Video	Level:	Analog 0.7 Vpp
	Polarity:	positive
	Impedance:	75Ω
Sync :	H.V. Separate Sync, TTL compatible	

2. *PICTURE PERFORMANCE*

- During burn-in the monitor is working under free-running condition, the G2 voltage is increased so that the raster becomes visible.
- Test condition: Standard test conditions

2.1 NOMINAL PICTURE SIZE INCLUDING CENTERING



- H-size: 300 +/- 5 mm
- V-size: 220 +/- 5 mm

- H-offset: | a-b | <= 6 mm
- V-offset: | c-d | <= 6 mm

Remark: for other display modes,
- H-offset: | a-b | ≤ 12 mm;
video within raster
- V-offset: | c-d | ≤ 8 mm;
* Video within raster

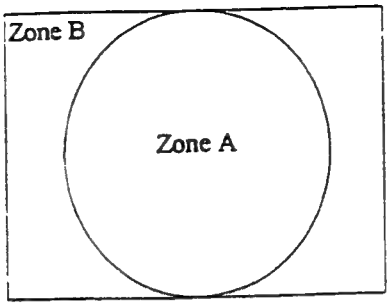
2.2 SIZE CONTROL RANGE

	Primary mode	Other mode
- Horizontal	> 20 mm	> 20 mm
- Vertical	> 50 mm	> 50 mm

2.3 POSITION CONTROL RANGE (related to center position)

	Primary mode	Other mode
- Horizontal	≥ 20 mm	≥ 20 mm
- Vertical	≥ 15 mm	≥ 15 mm

2.4 MISCONVERGENCY

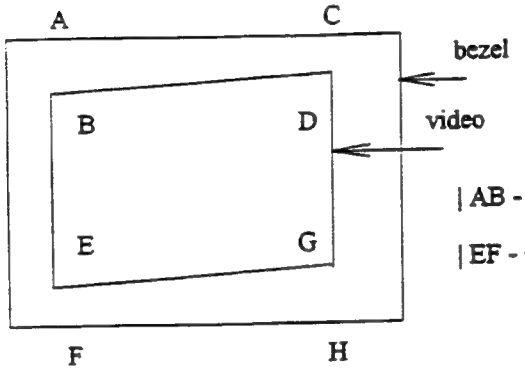


300
x
220
mm

- Zone A: 0.3 mm in all modes
- Zone B: 0.4 mm in all modes

Zone A is defined as a circle at the center of the CRT with a diameter of the vertical picture size.
Zone B is the total display area excluding zone A.

2.5 TILT



| AB - CD | = Tilt on top ≤ 1.5mm

| EF - GH | = Tilt on bottom ≤ 2.0mm

2.6 LINEARITY

- Horizontal <= 10 % (Max-Min) / average x 100 % <= 10 %
- Vertical <= 10 %

Check linearity with 12 x 8 crosshatch pattern.
Definition of Average : **Avert.**= Picture vertical size / 8 ;
Ahoriz.= Picture horizontal. size / 12.

2.7 GEOMETRIC DISTORTIONS (INCLUDES ALL DISTORTION LIKE PINCUSHION , BARREL , TRAPEZOID...)

	Primary mode	Other mode
-Total geometric distortion		
Top & Bottom	≤ 2.0 mm	≤ 2.5 mm
Left & Right	≤ 2.5 mm	≤ 2.5 mm
- Pincushion		
Top & Bottom	≤ 1.5 mm	≤ 2.0 mm
Left & Right	≤ 2.0 mm	≤ 2.0 mm
- 1/6 Pincushion		
Top, Bottom, Left & Right	≤ 1.0 mm	≤ 1.0 mm
- S Curve	≤ 1.0 mm	≤ 1.0 mm
- Barrel		
Left & Right	≤ 1 mm	≤ 1.2 mm
Top & Bottom	≤ 1.5 mm	≤ 1.5 mm

According to DIN 66234 T2 the geometric distortion of the picture must be less than 1% of the nominal picture size.

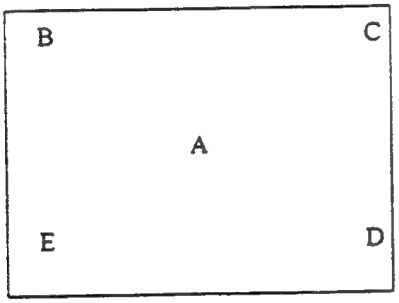
2.8 JITTER

Jitter of character < 0.1 mm (DIN 66234 T2) inspected at 40 cm away from DUT.

3. *LUMINANCE OUTPUT*

Under standard test conditions
- Resolution: 1024 x 768
- Vertical frequency: 75 Hz
- Horizontal frequency: 60 kHz
- Measured at CRT center position
- 100 % all white pattern: 35 FL min. (Full white at Brightness → Max. Contrast →Max.)
- Center window pattern (Chroma pattern: 112): 55FL min. (Brightness → Max; Contrast →Max.)
- Background: 0.7 ± 0.5 FL (Brightness → max.; Contrast → min.)

3.1 BRIGHTNESS UNIFORMITY



300 x 220 mm A = 35 FL

$$\frac{B\ (C,\ D,\ or\ E)}{A} \geq 70\%$$

If uniformity problems occurs, limit sample has to be defined.

3.2 WHITE COLOUR COORDINATES

9300 degree K	6500 degree K	5500 degree K
x = 0.281 +/- 8 %	x= 0.313 +/- 8%	x= 0.332 +/- 8%
y = 0.311 +/- 8 %	y= 0.329 +/- 8%	y= 0.348 +/- 8%

Test at - background: Brightness → max. ; Contrast → min.
- with light output: Brightness → min. ; Contrast → 5FL to Max.
- center window pattern

3.3 FOCUS

Light output setup: Pattern: Center window
Light output: 50FL.

Test pattern: M
Limit samples have to be selected by both parties if problems rise up during mass production. The focus has to be equal or better than the "limited sample."

3.4 PURITY

No electron beam will land on other phosphors. If problems rise up during mass production, " limit samples " have to be selected by both parties. The purity has to be equal or better than the " limit sample ".

3.5 MOIRE

On Screen Display control adjustable

3.6 RINGING

- Ringing is invisible. (Independent of the running mode ; light output : 15FL and above).
- If problems rise up during mass production, " limit samples " have to be selected by both parties. Ringing and moiré has to be equal or better than the " limit sample ".

3.6 DISTANCE BETWEEN TWO MONITORS

Two monitors of the same type with different frequencies can be operated at a distance of down to 25 cm without any interference.

4. APPROVALS

4.1 Safety

- UL 1950
- CSA C22.2 NO. 950-M89
- EC, EN 60950 (TUV/GS)

4.2 X-RAY

- DHHS

4.3 EMI

- FCC Class B
- CE (EN50081 + EN50082) **For CE product periodically CE-retest is requested.**

4.4 LOW RADIATION

- Certificate from SEMKO measured according to MPR II guidelines 1990-10.
- TCO 92 (option)

4.5 ERGOMONICAL DEMANDS AND GENERAL REQUIREMENTS

- ISO 9241 part 3 respectively EN 29241-3 as far applicable
- ISO 9241 part 8

4.6 TOXIC MATERIALS

The usage of PCB, asbestos, cadmium and CFC's is not allowed.

FLAMEPROOFING AGENTS
- All materials (including boards) used for this product are not easily inflammable.
- The monitor is completely free of any polychlorinated biphenyl (PCB), polybrominated or polychlorinated dihpenylether (PBDE, PCDE), polybrominated or polychlorinated dibenzofuran (PBDF, PCDF).

UNPLEASANT SMELL AND TOXIC GAS RADIATION
The monitor does not radiate any unpleasant smell during operation.
- The monitor does not radiate any toxic gases or substances which are mentioned in the "TRK" -list of "Deutsche Forschungsgemeinschaft".

5. RELIABILITY

5.1 MONITOR Mean Time Between Failure

The MTBF of the monitor has to be 50000 hours demonstration MTBF

5.2 LIFETIME OF CRT

Refer to CRT Spec.

5.3 ARCING OF CRT

Arcing test is performed with a laser gum, 50 times on each grid and cathode

5.4 AMBIENCE

Operating temperature: 0 - 40°C (32 -104°F)
Storage temperature: -20 - 60°C (-4 - 140°F)
Humidity: 10 - 90%

5.5 VIBRATION TEST & DROP TEST

Follow MAG Reliability Test Procedure FWU-001 Section II Environmental Test

6. MECHANICAL SPECIFICATION

6.1 MAIN DIMENSIONS

Without packing :
- Width :409mm x Height :421mm x Depth :464mm

6.2 WEIGHT

- Net : 21.2 Kg (46.7bs); Gross : 24.2Kg (53.3lbs)

6.3 TILT / SWIVEL ANGLE

- 90 +/- 5 degree side to side
- 13 +/- 1 degree up
- 3 +/- 1 degree down

6.4 PLASTIC

6.4.1 MATERIAL

Material for front bezel, housing, power knob. control knob are ABS (VE-810) and for tilt / swivel base is ABS 94HB (SD-150).

6.4.2 COLOR

Resin color is IBM color

6.5 RECYCLE

- Metal coated plastic is not allowed to be used.
- Plastic part larger than 20 cm x cm or heavier than 50g have to be marked with material designation and recycling symbol (DIN 54840)
- All parts should be easily recyclable (VD 12243)
- All packing materials made from plastic have to be marked with recycling sign in accordance with subpart 2 (DIN 6120).

7. CONTROLS AND CONNECTORS

7.1 INPUT CONNECTORS:

15 pin mini D-sub connector

pin number	pin function
1	Red video input
2	Green video input
3	Blue video input
4	Ground
5	Ground
6	Red return
7	Green return
8	Blue return
9	NC
10	Ground
11	Ground
12	SDA
13	H-sync
14	V-sync
15	SCL

7.2 EXTERNAL CONTROLS

Front:
1. Power switch
2. Power LED
3. Menu selection button
4. Select control button ◄ ►
5. Adjustment control button + –
6. On-screen display (OSD) menu:

On Screen Display:
First Page:

1. Contrast Control
2. Brightness Control
3. Horizontal Size Control
4. Horizontal Position Control
5. Vertical Height Control
6. Vertical Position Control
7. Pincushion Control
8. Trapezoid Control
9. Rotation Control
10. Degaussing
11. Recall

Second Page: Advanced Functions

1. Bow
2. Parallelogram
3. Corner
4. S-Curve
5. Horizontal Convergence
6. Vertical Convergence
7. Moiré
8. Save User Mode
9. Recall

Third Page: Color Manager 9300°K, 6500°K, 5500°K

1. Color Red Control
2. Color Green Control
3. Color Blue Control

Fourth Page: OSD Manager

1. Horizontal Position
2. Vertical Position

8. *PLUG & PLAY*

This DX 700T model is the Windows95 compatible monitor. The Display Data Channel "DDC" function can allow the display to inform the host system about its identity and, depending on the level of DDC used, communicate additional levels of display capabilities.

DDC1: One uni-directional data channel
DDC2: One bi-directional data channel

MAG DX 700T can support display type DDC1/2B

9. *DISPLAY POWER MANAGEMENT*

9.1 DEFINITION OF MODES

There are three modes of operation for the DX 700T. These are ON, SUSPEND and OFF.

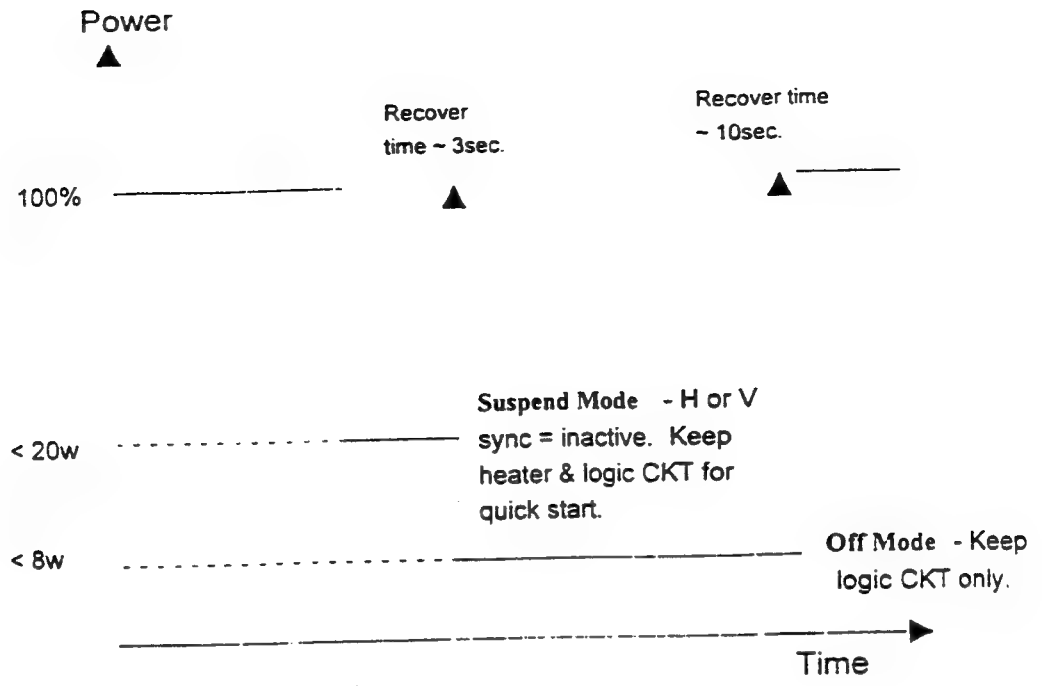
ON Both Horizontal and Vertical sync are present and the monitor is in normal operation.

SUSPEND Horizontal or Vertical sync is inactive per VESA DPMS spec. and not operational. All parts of the monitor are disabled except for the CRT heater and the Detection Logic Circuit .With CRT heater "hot" ,the monitor is able to perform a quick start when both Horizontal and Vertical signals are active again.

OFF Both Horizontal and Vertical sync are inactive per VESA DPMS spec. and not operational and all parts of the monitor are disabled including the CRT heater. This is the lowest possible power state of the monitor that maintains automatic on when the both Horizontal and Vertical signals are active again. Restart will take longer than the suspend mode because the CRT heater has to warm-up again.

9.2 POWER CONSUMPTION

Normal operation : 130 W
Suspend mode : < 20 W
Off mode : < 8 W



9.3 DISABLING POWER MANAGEMENT FUNCTION

When power on and no horizontal and vertical sync input , the power management function is disabled.

When applying the horizontal and vertical signals , the Power Management function will be enabled.

10. Timings

10.1 UNIVERSAL VERSION

	Primary Mode	Other Modes		
Format	1024x768 75Hz	640x350 70Hz	720x400 70Hz	640x480 60Hz
Pixel Clock	78.75MHz	25.176MHz	28.3196MHz	25.175MHz
	T32	T13	[redacted]	T125
Horizontal:				
Sync Polarity	P	P	N	N
Frequency	60.023KHz	31.47KHz	31.466KHz	31.469KHz
Total Time	16.660µs	31.776µs	31.78µs	31.778µs
Display Time	13.003µs	25.42µs	25.424µs	25.422µs
Sync Width	1.219µs	3.813µs	3.813µs	3.813µs
Back Porch	2.235µs	1.91µs	1.907µs	1.907µs
Front Porch	0.203µs	0.635µs	0.636µs	0.636µs
Blank Time	3.657µs	6.355µs	6.356µs	6.355µs
Vertical:				
Sync Polarity	P	N	P	N
Frequency	75.029Hz	70.089Hz	70.081Hz	59.940Hz
Total Time	13.328ms	14.268ms	14.269ms	16.683ms
Display Time	12.795ms	11.122ms	12.712ms	15.253ms
Sync Width	0.050ms	0.064ms	0.064ms	0.064ms
Back Porch	0.466ms	1.907ms	1.112ms	1.048ms
Front Porch	0.017ms	1.176ms	0.381ms	0.318ms
Blank Time	0.533ms	3.147ms	1.557ms	1.430ms

	Other Modes			
Format	640x480 67Hz	640x480 75Hz	640x480 85Hz	800x600 60Hz
Pixel Clock	30.24MHz	31.5MHz	36MHz	40MHz
	T110	T115	T551	T123
Horizontal:				
Sync Polarity	P/N	N	N	P
Frequency	35.00KHz	37.50KHz	43.269KHz	37.879KHz
Total Time	28.57µs	26.667µs	23.111µs	26.400µs
Display Time	21.16µs	20.317µs	17.778µs	20.000µs
Sync Width	2.12µs	2.032µs	1.556µs	3.200µs
Back Porch	3.31µs	3.810µs	2.222µs	2.200µs
Front Porch	1.98µs	0.508µs	1.556µs	1.000µs
Blank Time	7.41µs	6.349µs	5.333µs	6.400µs
Vertical:				
Sync Polarity	COM	N	N	P
Frequency	66.667Hz	75.000Hz	85.008Hz	60.317Hz
Total Time	15.00ms	13.333ms	11.764ms	16.579ms
Display Time	13.714ms	12.800ms	11.093ms	15.840ms
Sync Width	0.086ms	0.080ms	0.069ms	0.106ms
Back Porch	1.114ms	0.427ms	0.578ms	0.607ms
Front Porch	0.086ms	0.027ms	0.023ms	0.026ms
Blank Time	1.286ms	0.533ms	0.670ms	0.739ms

Other Modes				
Format	*800x600 72Hz*	*800x600 75Hz*	*800x600 85Hz*	*832x624 75Hz*
Pixel Clock	*50MHz*	*49.5MHz*	*56.25MHz*	*57.272MHz*
	T136	T133	"T352"	"T353"
Horizontal:				
Sync Polarity	P	P	P	P/N
Frequency	48.077KHz	46.875KHz	53.674Khz	49.715KHz
Total Time	20.800µs	21.333µs	18.631µs	20.114µs
Display Time	16.000µs	16.162µs	14.222µs	14.53µs
Sync Width	2.400µs	1.616µs	1.138µs	1.12µs
Back Porch	1.280µs	3.232µs	2.702µs	3.91µs
Front Porch	1.120µs	0.323us	0.569µs	0.56µs
Blank Time	4.800µs	5.172µs	4.409µs	5.59µs
Vertical:				
Sync Polarity	P	P	P	P/N
Frequency	72.188Hz	75Hz	85.061Hz	74.54Hz
Total Time	13.853ms	13.333ms	11.756ms	13.42ms
Display Time	12.480ms	12.800ms	11.179ms	12.555ms
Sync Width	0.125ms	0.064ms	0.056ms	0.06ms
Back Porch	0.478ms	0.448ms	0.503ms	0.785ms
Front Porch	0.770ms	0.021ms	0.019ms	0.02ms
Blank Time	1.373ms	0.533ms	0.578ms	0.865ms

Other Modes				
Format	*1024x768 60Hz*	*1024x768 70Hz*	*1024x768 72Hz*	*1024x768 85Hz*
Pixel Clock	*65MHz*	*75.000MHz*	*78MHz*	*94.5MHz*
	T315	T319	T232	"T352"
Horizontal:				
Sync Polarity	N	N	P	P
Frequency	48.363KHz	56.476KHz	58.036KHz	68.677KHz
Total Time	20.677µs	17.707µs	17.23µs	14.561µs
Display Time	15.754µs	13.653µs	13.128µs	10.836µs
Sync Width	2.092µs	1.813µs	1.692µs	1.016µs
Back Porch	2.462µs	1.920µs	2.102µs	2.201µs
Front Porch	0.369µs	0.320µs	0.307µs	0.508µs
Blank Time	4.923µs	4.053µs	4.102µs	3.725µs
Vertical:				
Sync Polarity	N	N	P	P
Frequency	60.004Hz	70.069Hz	71.915Hz	84.997Hz
Total Time	16.666ms	14.272ms	13.905ms	11.765ms
Display Time	15.880ms	13.599ms	13.233ms	11.183ms
Sync Width	0.124ms	0.106ms	0.103ms	0.044ms
Back Porch	0.600ms	0.513ms	0.516ms	0.524ms
Front Porch	0.062ms	0.053ms	0.051ms	0.015ms
Blank Time	0.786ms	0.673ms	0.672ms	0.583ms

Other Modes		
Format	*1024x768 87Hz (i)*	*1280x1024 60Hz*
Pixel Clock	*44.9034MHz*	*110MHz*
	Interlaced Timing	*Timing*
Horizontal:		
Sync Polarity	P	P
Frequency	35.522KHz	63.974KHz
Total Time	28.151μs	15.631μs
Display Time	22.806μs	11.797μs
Sync Width	3.92μs	1.18μs
Back Porch	1.247us	2.065μs
Front Porch	0.178μs	0.59μs
Blank Time	5.345μs	3.834μs
Vertical:		
Sync Polarity	P	P
Frequency	86.96Hz	60.013Hz
Total Time	11.49ms	16.663ms
Display Time	10.81ms	16.006ms
Sync Width	0.113ms	0.047ms
Back Porch	0.563ms	0.594ms
Front Porch	0.00ms	0.016ms
Blank Time	0.676ms	0.657ms

10.2 JAPANESE VERSION

	Primary Mode	Other Modes		
Format	*1024x768 75Hz*	*640x400 56.4Hz*	*640x350 70Hz*	*720x400 70Hz*
Pixel Clock	*78.75MHz*	*21.0526MHz*	*25.176MHz*	*28.3196MHz*
Horizontal:				
Sync Polarity	P	P/N	P	N
Frequency	60.023KHz	24.83KHz	31.47KHz	31.466KHz
Total Time	16.660µs	40.28µs	31.776µs	31.78µs
Display Time	13.003µs	30.4µs	25.42µs	25.424µs
Sync Width	1.219µs	3.04µs	3.813µs	3.813µs
Back Porch	2.235µs	3.8µs	1.91µs	1.907µs
Front Porch	0.203µs	3.04µs	0.635µs	0.636µs
Blank Time	3.657µs	9.88µs	6.355µs	6.356µs
Vertical:				
Sync Polarity	P	P/N	N	P
Frequency	75.029Hz	56.4Hz	70.089Hz	70.081Hz
Total Time	13.328ms	17.72ms	14.268ms	14.269ms
Display Time	12.795ms	16.11ms	11.122ms	12.712ms
Sync Width	0.050ms	0.32ms	0.064ms	0.064ms
Back Porch	0.466ms	1.01ms	1.907ms	1.112ms
Front Porch	0.017ms	0.28ms	1.176ms	0.381ms
Blank Time	0.533ms	1.61ms	3.147ms	1.557ms

	Other Modes			
Format	*640x480 60Hz*	*640x480 67Hz*	*640x480 75Hz*	*640x480 85Hz*
Pixel Clock	*25.175MHz*	*30.24MHz*	*31.5MHz*	*36MHz*
Horizontal:				
Sync Polarity	N	P/N	N	N
Frequency	31.469KHz	35.00KHz	37.50KHz	43.269KHz
Total Time	31.778µs	28.57µs	26.667µs	23.111µs
Display Time	25.422µs	21.16µs	20.317µs	17.778µs
Sync Width	3.813µs	2.12µs	2.032µs	1.556µs
Back Porch	1.907µs	3.31µs	3.810µs	2.222µs
Front Porch	0.636µs	1.98µs	0.508µs	1.556µs
Blank Time	6.355µs	7.41µs	6.349µs	5.333µs
Vertical:				
Sync Polarity	N	P/N	N	N
Frequency	59.940Hz	66.667Hz	75.000Hz	85.008Hz
Total Time	16.683ms	15.00ms	13.333ms	11.764ms
Display Time	15.253ms	13.714ms	12.800ms	11.093ms
Sync Width	0.064ms	0.086ms	0.080ms	0.069ms
Back Porch	1.048ms	1.114ms	0.427ms	0.578ms
Front Porch	0.318ms	0.086ms	0.027ms	0.023ms
Blank Time	1.430ms	1.286ms	0.533ms	0.670ms

Other Modes				
Format	*800x600 60Hz*	*800x600 72Hz*	*800x600 75Hz*	*800x600 85Hz*
Pixel Clock	*40MHz*	*50MHz*	*49.5MHz*	*56.25MHz*
Horizontal:				
Sync Polarity	P	P	P	P
Frequency	37.879KHz	48.077KHz	46.875KHz	53.674Khz
Total Time	26.400µs	20.800µs	21.333µs	18.631µs
Display Time	20.000µs	16.000µs	16.162µs	14.222µs
Sync Width	3.200µs	2.400µs	1.616µs	1.138µs
Back Porch	2.200µs	1.280µs	3.232µs	2.702µs
Front Porch	1.000µs	1.120µs	0.323us	0.569µs
Blank Time	6.400µs	4.800µs	5.172µs	4.409µs
Vertical:				
Sync Polarity	P	P	P	P
Frequency	60.317Hz	72.188Hz	75Hz	85.061Hz
Total Time	16.579ms	13.853ms	13.333ms	11.756ms
Display Time	15.840ms	12.480ms	12.800ms	11.179ms
Sync Width	0.106ms	0.125ms	0.064ms	0.056ms
Back Porch	0.607ms	0.478ms	0.448ms	0.503ms
Front Porch	0.026ms	0.770ms	0.021ms	0.019ms
Blank Time	0.739ms	1.373ms	0.533ms	0.578ms

Other Modes				
Format	*832x624 75Hz*	*1024x768 60Hz*	*1024x768 70Hz*	*1024x768 72Hz*
Pixel Clock	*57.272MHz*	*65MHz*	*75.000MHz*	*78MHz*
Horizontal:				
Sync Polarity	P/N	N	N	P
Frequency	49.715KHz	48.363KHz	56.476KHz	58.036KHz
Total Time	20.114µs	20.677µs	17.707µs	17.23µs
Display Time	14.53µs	15.754µs	13.653µs	13.128µs
Sync Width	1.12µs	2.092µs	1.813µs	1.692µs
Back Porch	3.91µs	2.462µs	1.920µs	2.102µs
Front Porch	0.56µs	0.369µs	0.320µs	0.307µs
Blank Time	5.59µs	4.923µs	4.053µs	4.102µs
Vertical:				
Sync Polarity	P/N	N	N	P
Frequency	74.54Hz	60.004Hz	70.069Hz	71.915Hz
Total Time	13.42ms	16.666ms	14.272ms	13.905ms
Display Time	12.555ms	15.880ms	13.599ms	13.233ms
Sync Width	0.06ms	0.124ms	0.106ms	0.103ms
Back Porch	0.785ms	0.600ms	0.513ms	0.516ms
Front Porch	0.02ms	0.062ms	0.053ms	0.051ms
Blank Time	0.865ms	0.786ms	0.673ms	0.672ms

Other Modes		
Format	*1024x768 85Hz*	*1280x1024 60Hz*
Pixel Clock	*94.5MHz*	*110MHz*
Horizontal:		
Sync Polarity	P	P
Frequency	68.677KHz	63.974KHz
Total Time	14.561μs	15.631μs
Display Time	10.836μs	11.797μs
Sync Width	1.016μs	1.18μs
Back Porch	2.201μs	2.065μs
Front Porch	0.508μs	0.59μs
Blank Time	3.725μs	3.834μs
Vertical:		
Sync Polarity	P	P
Frequency	84.997Hz	60.013Hz
Total Time	11.765ms	16.663ms
Display Time	11.183ms	16.006ms
Sync Width	0.044ms	0.047ms
Back Porch	0.524ms	0.594ms
Front Porch	0.015ms	0.016ms
Blank Time	0.583ms	0.657ms

Chapter Four : Entry Reference

1. *Warning*

Some test points are very critical dangerous, you have to be very careful from electric shock when you repair.

CRT Anode

Be careful of the high voltage, about 24.5KV to 29KV when touching the FBT red rubber protecting cover. When it becomes loose or broken, please replace it with a new one. Make sure to connect a Hi-Voltage probe to your multimeter and have a good ground while measuring the CRT anode voltage.

Flyback Transformer (FBT) :

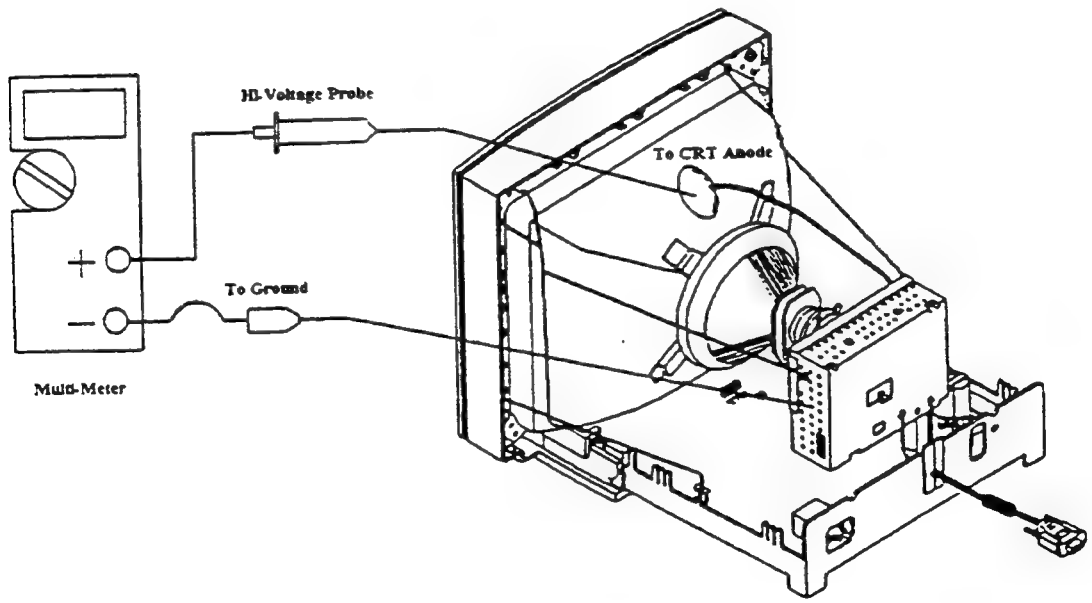
FBT is a main Hi-Voltage and Horizontal deflection generator. The voltage nearby could be higher than 1.2 KV.

Horizontal Deflection York :

Pay attention, as the voltage can be as high as 1.2 KV.

Power Supply Circuit :

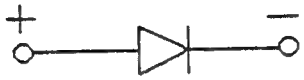
Pay attention to the high current in the supply circuit.



2. How to Test Diode & Transistor

When you test diode and transistor, you could refer these values as followed to know if they work or not.

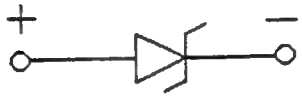
1. *Diode :*



V_F = 0.5~0.7
V_R= OPEN

F: Forward - Bias
R: Reverse - Bias

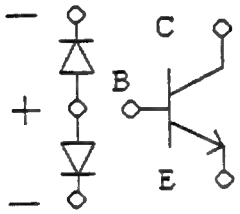
2. *ZENER Diode :*



V_F = 0.7~0.8
V_R= OPEN

F: Forward - Bias
R: Reverse - Bias

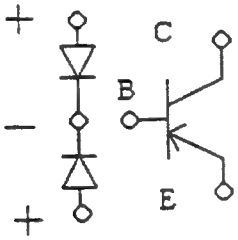
3. *BJTs (Bipolar Junction Transistors) PNP TYPE*



V_{EB} = 0.4 ~ 0.6
V_{CB} = 0.4 ~ 0.6

V_{EB} = Emitter - Base Bias
V_{CB} = Collector - Base Bias

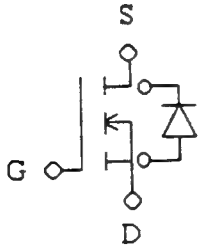
4. *BJTs (Bipolar Junction Transistors) PNP TYPE*



V_{EB} = 0.4 ~ 0.6
V_{CB} = 0.4 ~ 0.6
Otherwise: OPEN

V_{EB} = Emitter - Base Bias
V_{CB} = Collector - Base Bias

5. *MOS FETs (Metal-Oxide Semiconductor Field-Effect Transistor)*



V_{DS} = 0.4 ~ 0.6
Otherwise: OPEN

3. Error Code Description

A. Electric Region

ITEM	Error Code	Description
1	ENP	No power supply, and the power LED is off
2	ENR	No raster or background light, but power LED is on
3	ENV	No video, but has raster
4	EON	Continuous power ON-OFF problem with click sound and flashing power LED.
5	EPA	Abnormal power saving function.
6	EBN	Smoking problem with component or PCB burned out
7	EAN	Sound with low hum or sharp scream

B. Display Region

ITEM	Error Code	Description
1	EEV	Single vertical line shown on screen. (No horizontal deflection)
2	EEH	Single horizontal line shown on screen. (No vertical deflection)
3	ESV	Unsynchronized vertical sync, usually the video rolls up continuously
4	ESH	Unsynchronized horizontal sync, usually a lot of irregular lines on screen
5	EPS	Poor shock problem. When pounding on housing, there is something wrong shown on screen.
6	EPJ	Jitters problem with unstable picture
7	EFO	Focus problem with blurred or not clear characters on screen.
8	ECG	Convergence problem. The R,G,B lines don't meet at one white line.
9	EPU	Impurity of R,G,B color, not uniform color display
10	EPD	CRT blemish with black or color spots on screen or bubbles on CRT surface.
11	EWH	Abnormal horizontal size.
12	EWV	Abnormal vertical size.
13	EPF	Continuous picture shrinking and widening in horizontal size or vertical size.
14	EPH	Abnormal horizontal phase shift. The video cannot be set on the middle of screen.
15	EPV	Abnormal vertical position shift. The video cannot be set on the middle of screen.

C. Picture Distortion

ITEM	Error Code	Description
1	EDP	Pincushion or Barrel distortion.
2	EDS	S-curve distortion.
3	EDT	Tilt distortion.
4	ELH	Horizontal linearity problem.
5	ELV	Vertical linearity problem.

D. Brightness & Color Symptoms

ITEM	Error Code	Description
1	EBR	Abnormal raster brightness (too bright or too dim)
2	EBL	Abnormal retraced white line on screen.
3	ESE	Spot killer. A bright spot shown on screen while you turn off monitor.
4	EPL	Unstable brightness of raster or video.
5	ELR	No red or abnormal red.
6	ELG	No green or abnormal green.
7	ELB	No blue or abnormal blue.
8	EWB	Abnormal white balance.

E. VR, SW & Connector Functions

ITEM	Error Code	Description
1	EVB	Abnormal " Brightness VR " function..
2	EVC	Abnormal " Contrast VR " function.
3	EVH	Abnormal " Horizontal Size Key " function.
4	EVP	Abnormal " Horizontal Phase Key " function
5	EVS	Abnormal " Vertical Size Key " function.
6	EVV	Abnormal " Vertical Position Key " function.
7	EVN	Abnormal " Pincushion Key " function.
8	EVT	Abnormal " Trapezoid Key " function.
9	EMG	Abnormal " Degaussing Key " function
10	EMN	Abnormal " BNC/D-SUB Switch " function.
11	EMH	Abnormal " 75W/Hi-R Switch " function.
12	EMP	Abnormal " Preset / User Switch " function.
13	EMR	Abnormal " Recall Button " function.
14	EVG	Abnormal " CG VR " function.

F. LCD, LED Functions

ITEM	Error Code	Description
1	EMD	Incorrect timing display on LCD or LED.
2	EML	No display or incorrect display on LCD.
3	EMM	Poor memory or programming function.

G. Outlook Regions

ITEM	Error Code	Description
1	MP6	Housing(front bezel, back cover)is scratched or injured.
2	MP16	CRT is scratched.

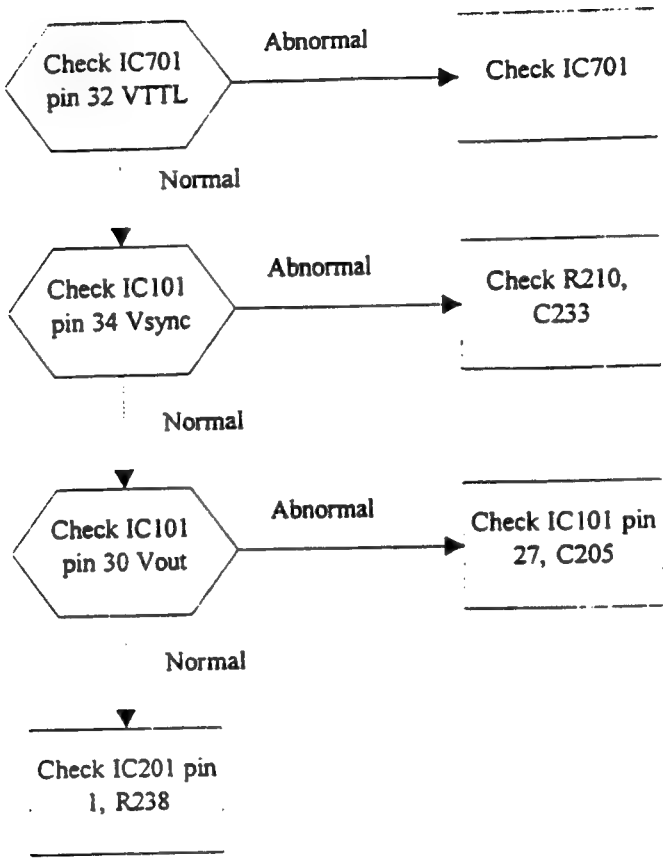
H. Repairing Code

ITEM	R Code	Description
1	A	Incorrect component embedded.
2	B	Lack of component.
3	C	Defective component.
4	N	Cold-soldered.
5	Q	PCB trace broken.
6	O	Short between pins by improper soldering.
7	R	Loosen connector or dropped connector.
8	V	Defective wire or harness.
9	@	Only alignment problem.
10	#	Checking O.K.

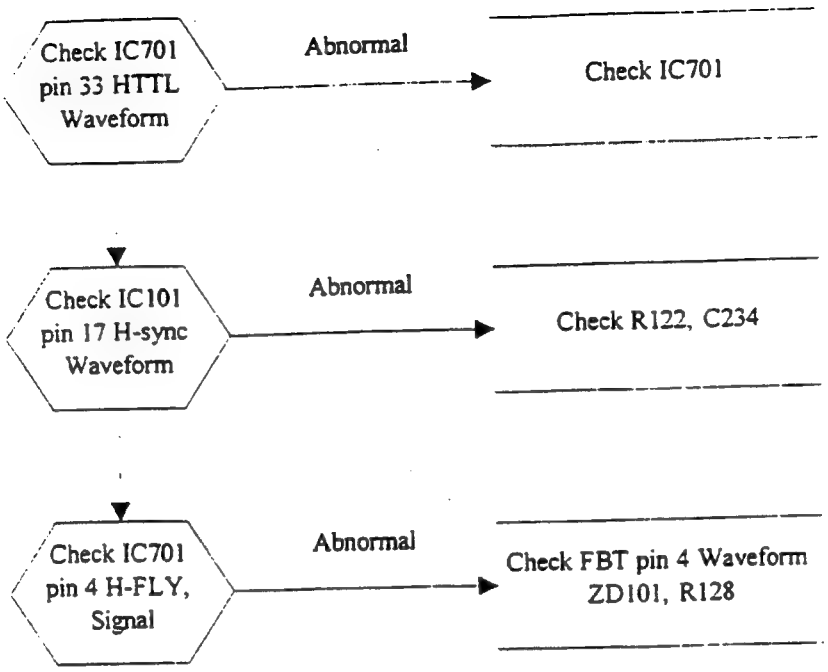
Chapter Five : Trouble Shooting

1. *Trouble Shooting*

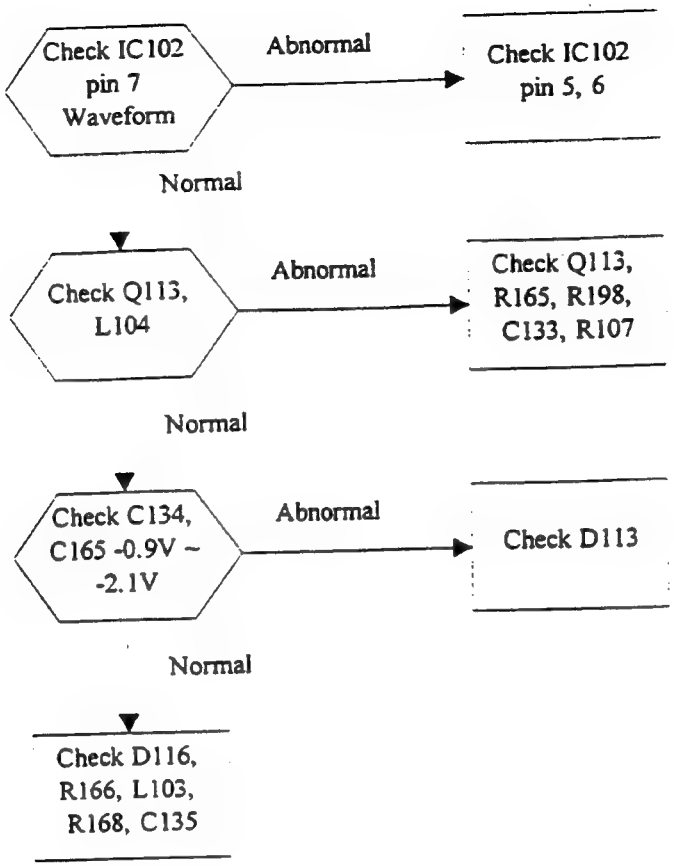
1.1 Vertical cannot synchronize



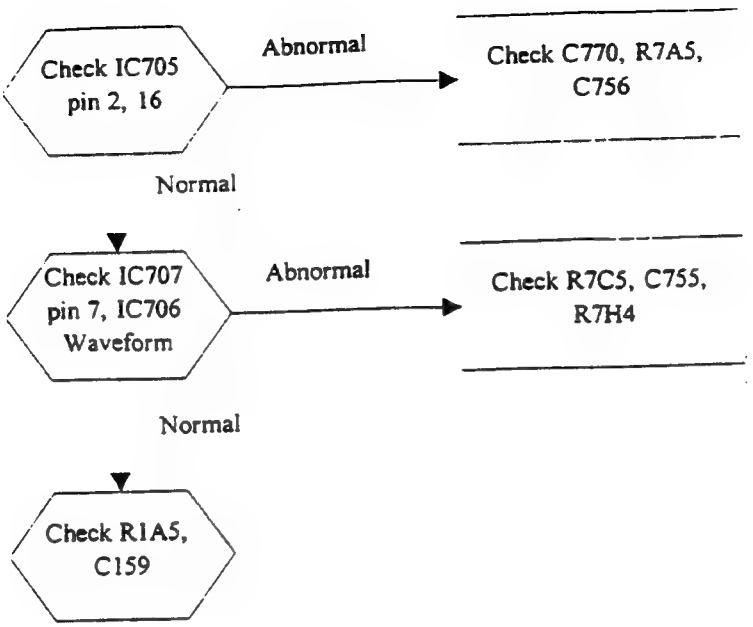
1.2 Horizontal cannot synchronize



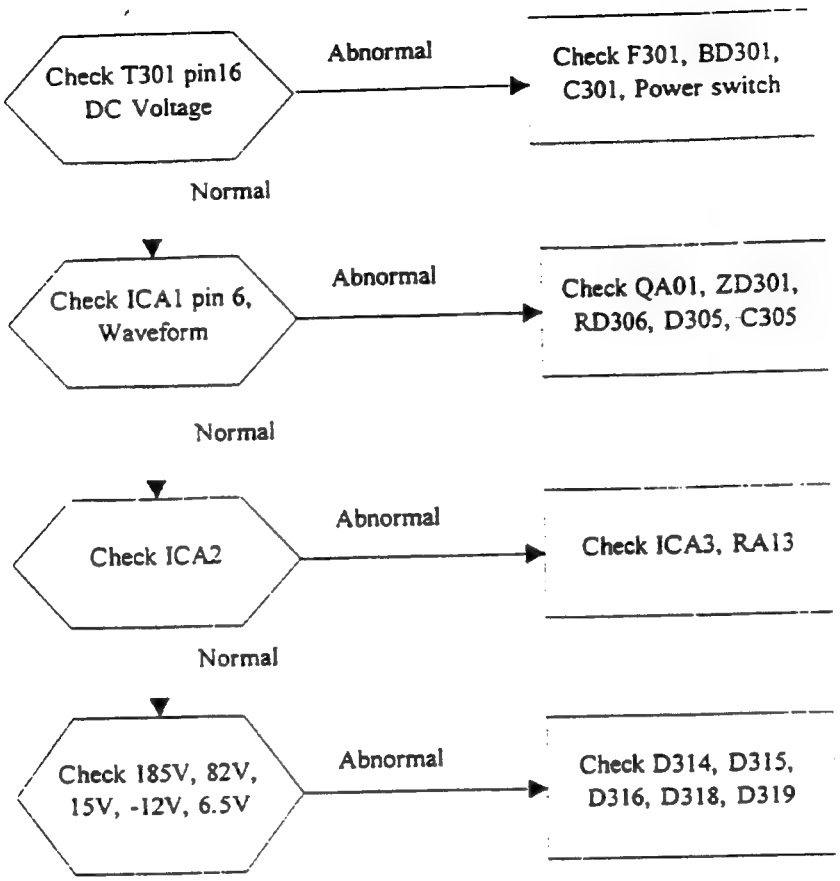
1.3 Single Horizontal Lin



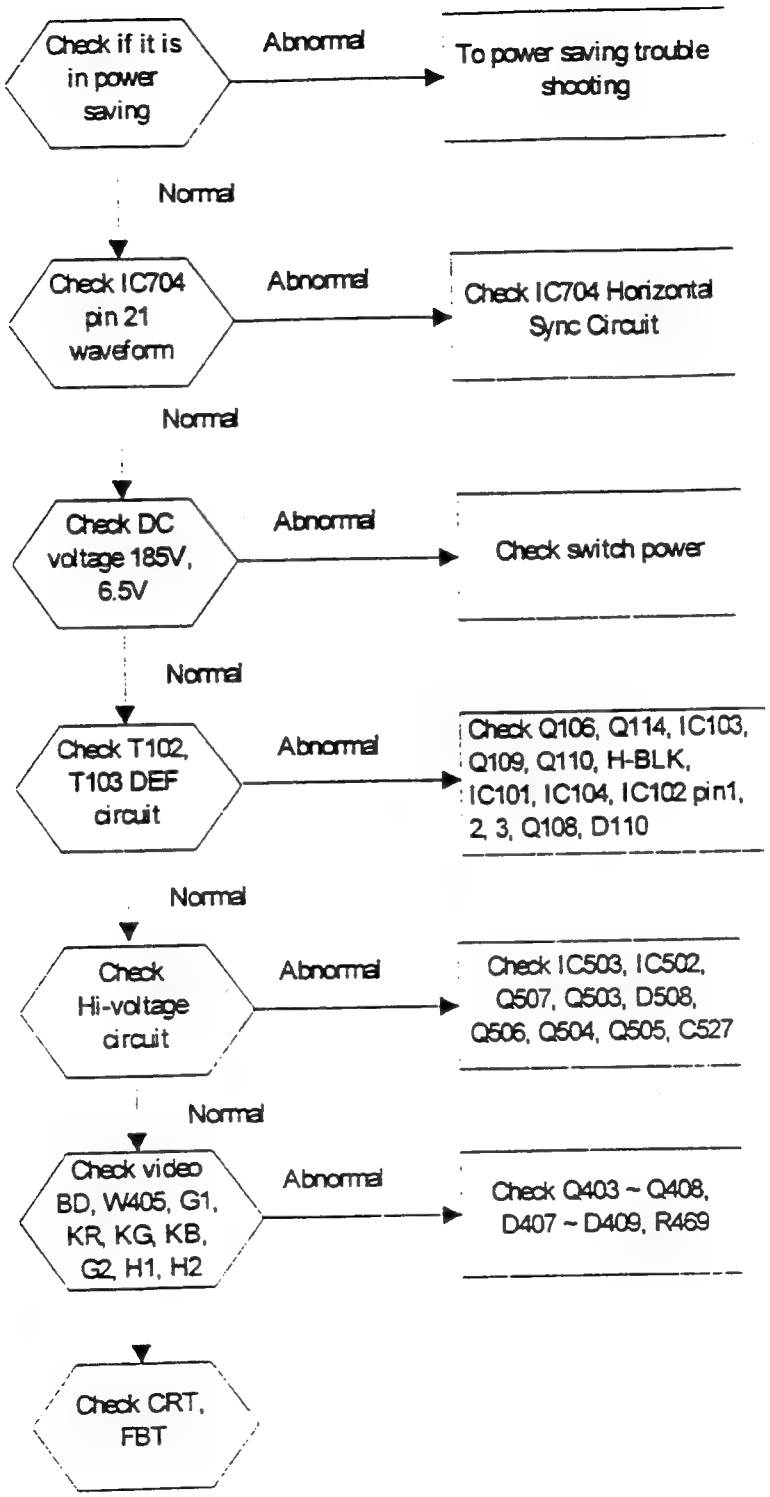
1.4 Pincushion & Distortio



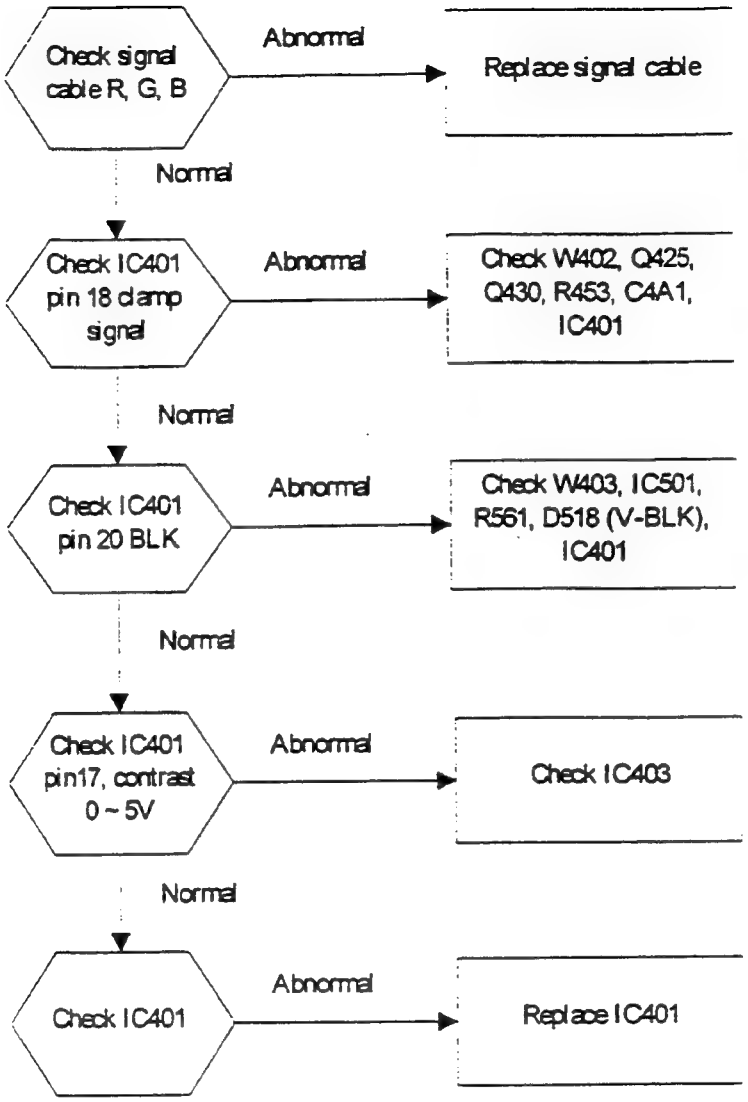
1.5 Power Supply Proble



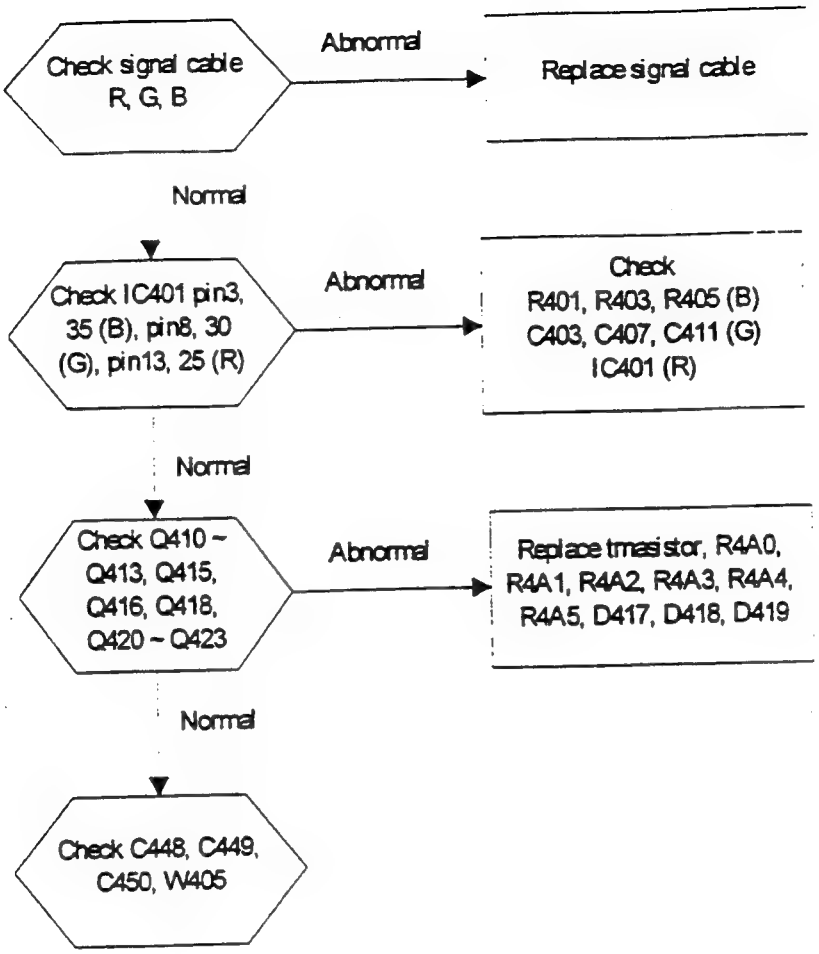
1.6 Raster does not appea



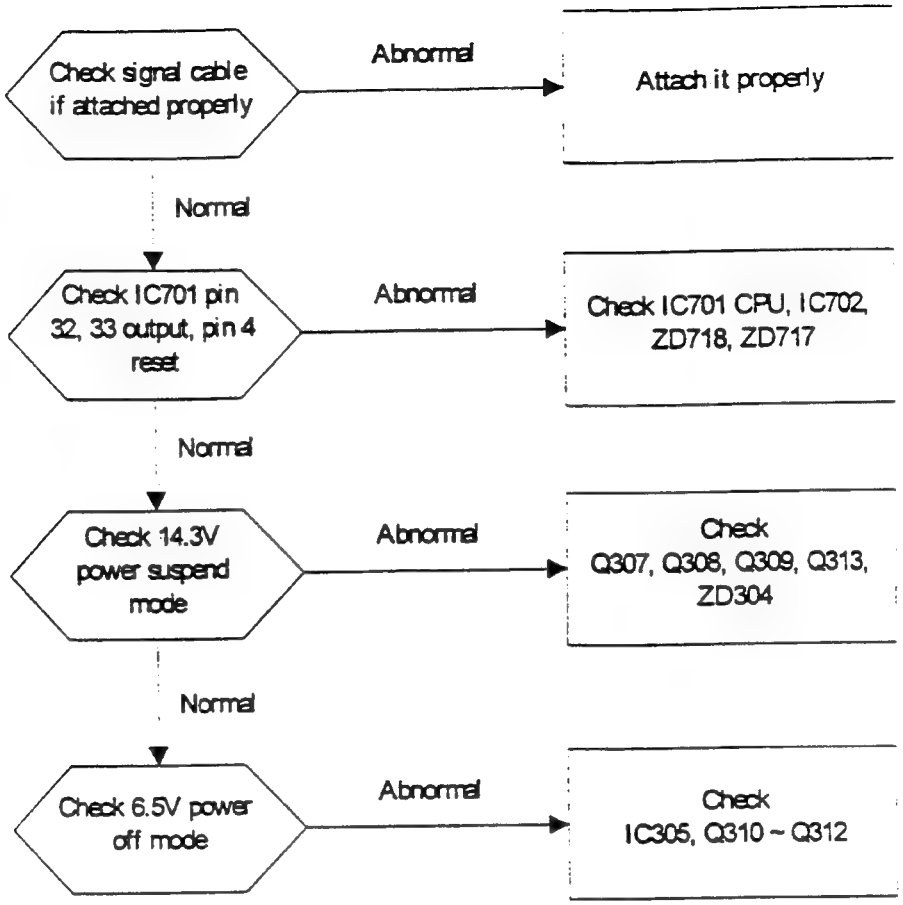
1.7 No Video but has Raster



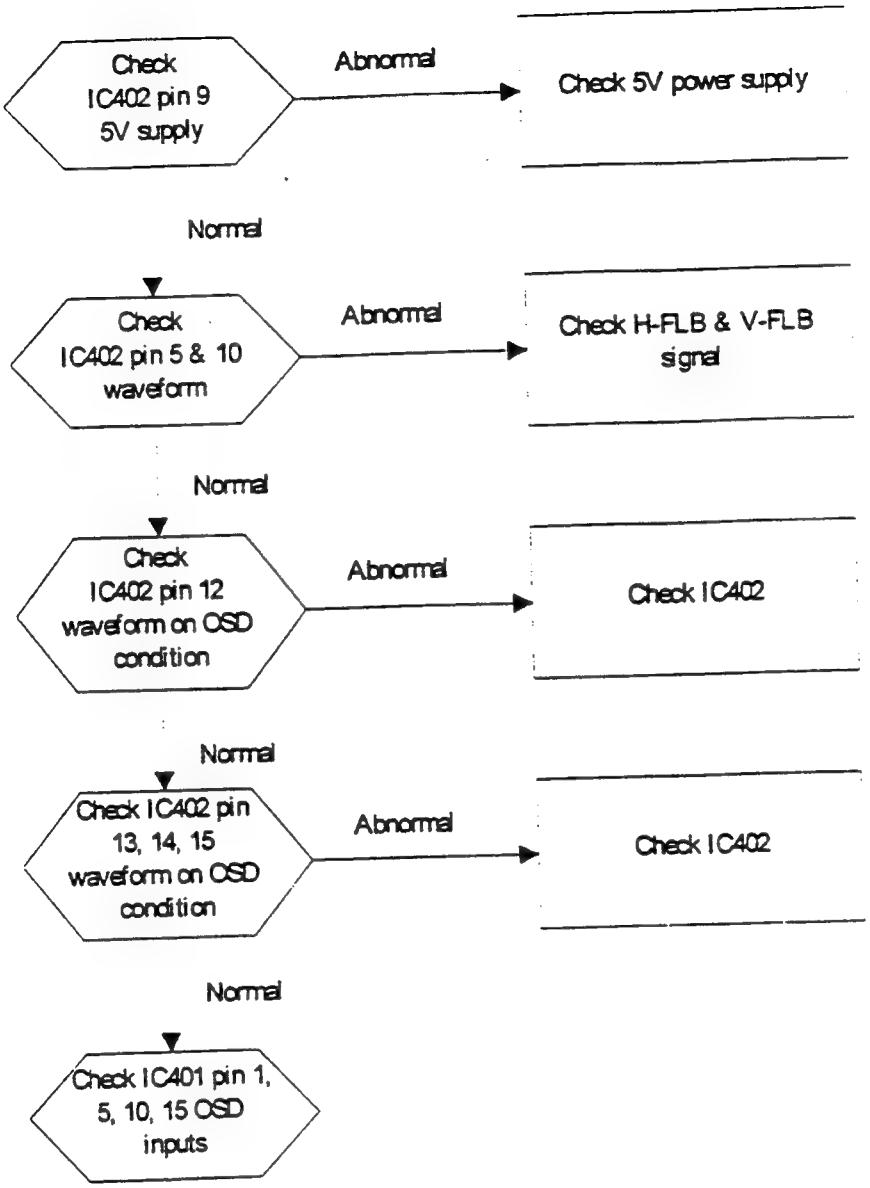
1.8 Video R, G, B color problem



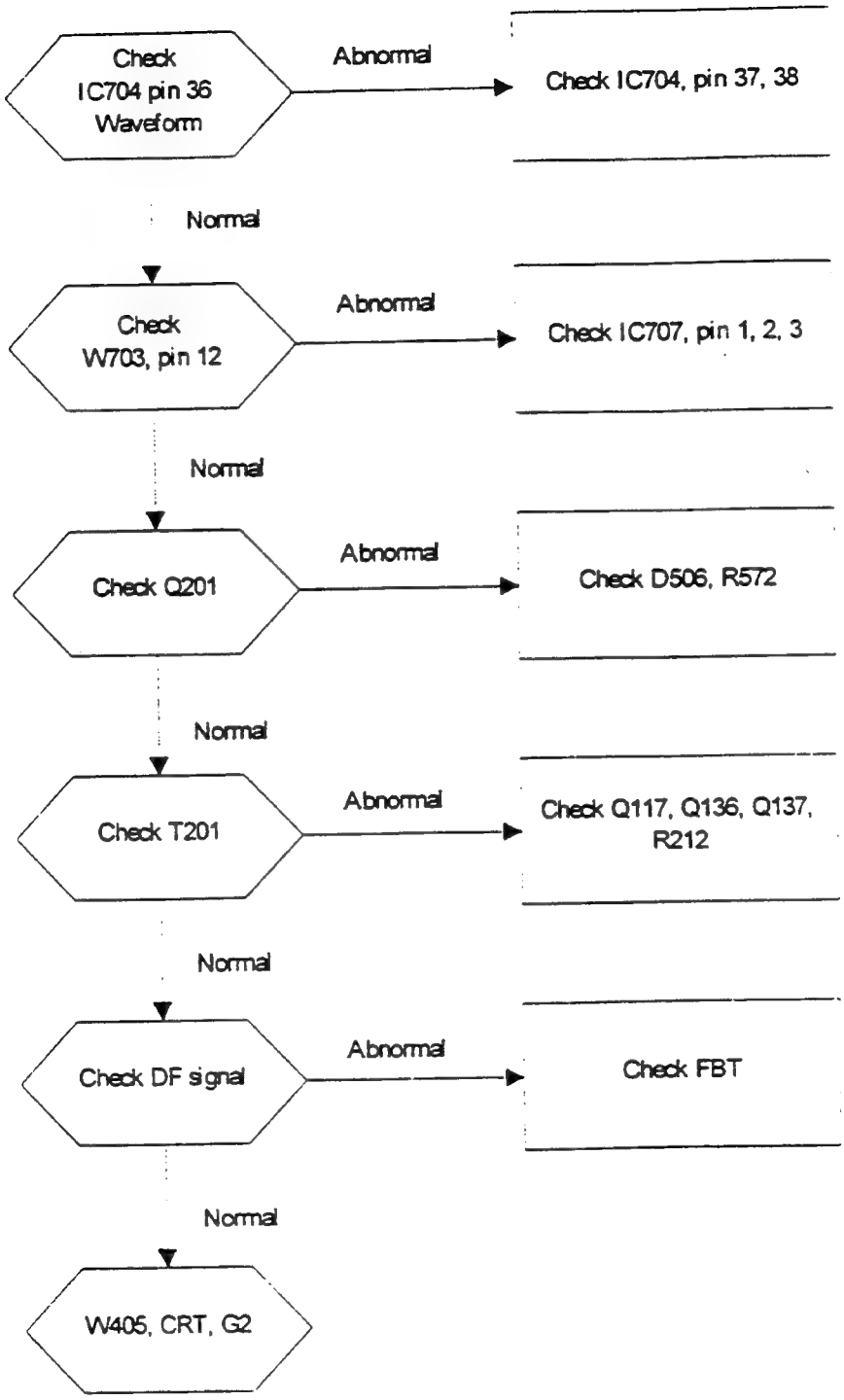
1.9 Power Saving Problem



1.10 OSD Related Problem



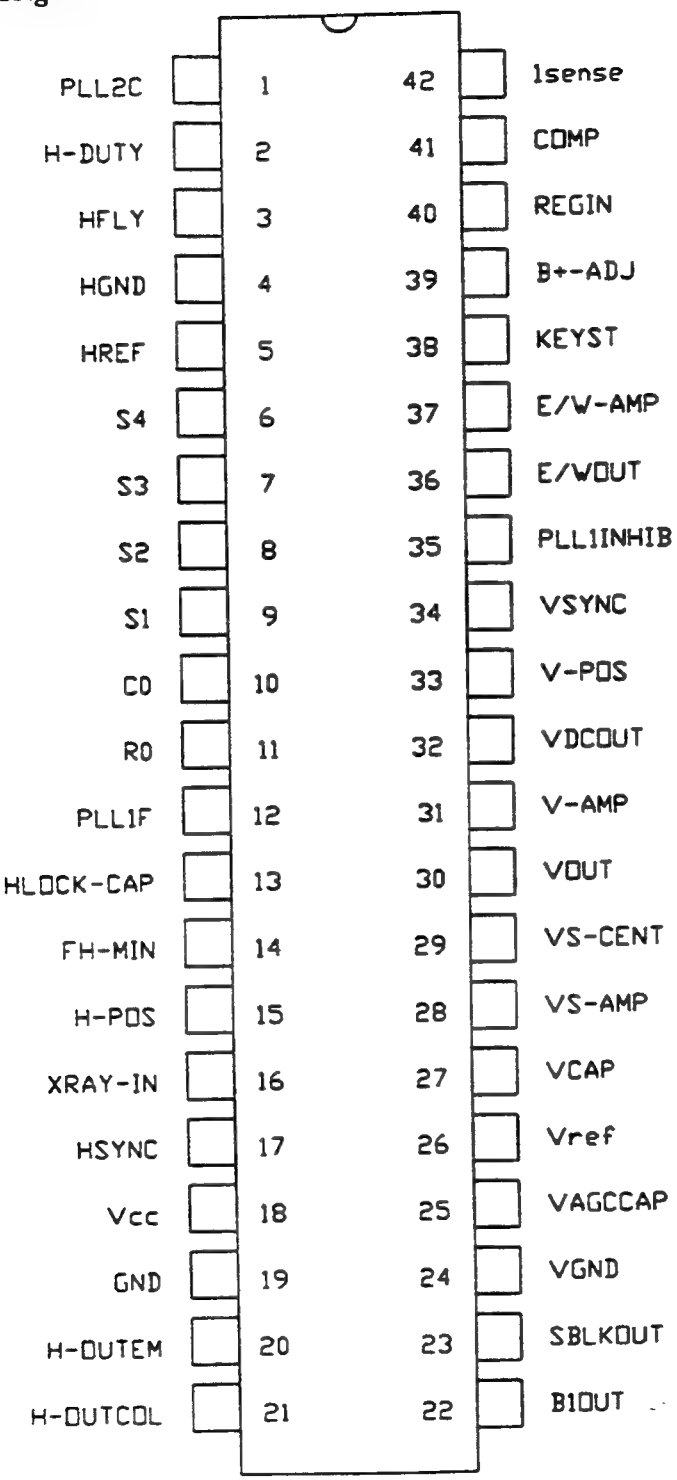
1.11 Dynamic Focus Problem



2. Component Pin Assignment

i TDA9103

Pin Assignment



Description

The TDA9103 is a monolithic integrated circuit assembled in a 42 pins shrunk dual line plastic package.

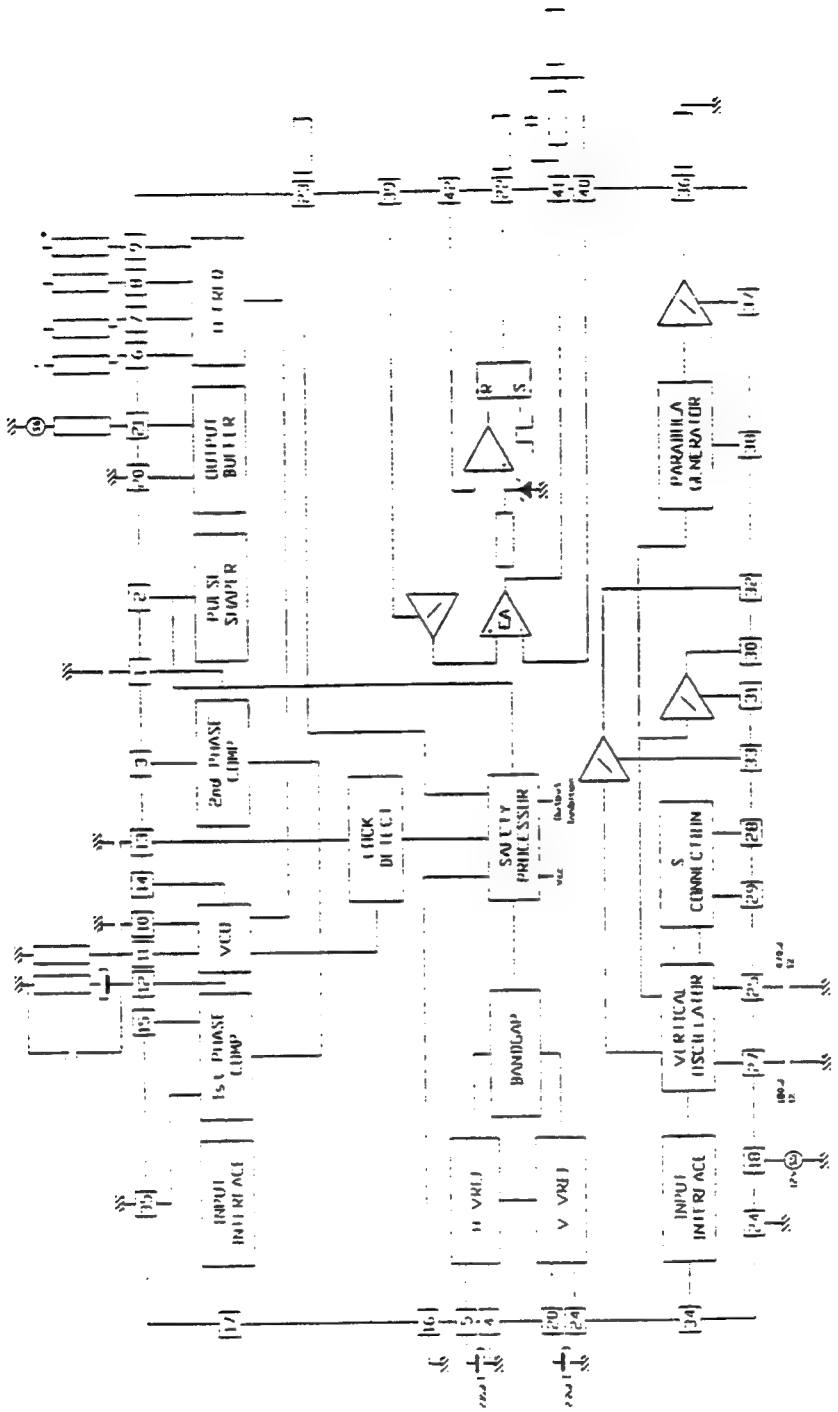
The goal of this IC is to control all functions related to the horizontal and vertical deflection in a multimodes or multisync monitor. The TDA9103 includes the following functions:

- Positive or Negative sync polarity
- Auto-sync Horizontal processing
- Auto-sync Vertical processing
- East/West signal processing block
- B+ controller
- H-PLL lock/unlock identification
- Safety blanking output

Pin-out Description

Pin No.	*Name*	*Function*
1.	PLL2C	Second PLL Loop Filter
2.	H-DUTY	DC Control of Horizontal Drive Output Pulse Duty-Cycle. If this pin is grounded, the horizontal and vertical outputs are inhibited. By connecting a capacitor on this pin, a soft-start function may be realized on H-Drive output.
3.	H-FLY	Horizontal Flyback Input (positive polarity)
4.	H-GND	Horizontal Section Ground
5.	H-REF	Horizontal Section Reference Voltage must be filtered.
6.	S4	Horizontal S-CAP Switching
7.	S3	Horizontal S-CAP Switching
8.	S2	Horizontal S-CAP Switching
9.	S1	Horizontal S-CAP Switching
10.	C0	Horizontal Oscillator Capacitor
11.	R0	Horizontal Oscillator Resistor
12.	PLL1F	First PLL Loop Filter
13.	HLOCK-CAP	First PLL Lock/Unlock Time Constant Capacitor. Capacitor filtering the frequency change detected on pin 13. When frequency is changing a blanking pulse is generated on pin 23. The duration of this pulse is proportional to the capacitor on pin 13.
14.	FH-MIN	DC Control for Free Running Frequency Setting
15.	H-POS	DC Control for Horizontal Centering
16.	XRAY-IN	X-Ray Protection Input (with internal latch function)
17.	H-SYNC	TTL Horizontal Sync Input
18.	Vcc	Supply Voltage (12V typical)
19.	GND	Ground
20.	H-OUTEM	Horizontal Drive Output (Emitter of Internal Transistor)

Pin No.	*Name*	*Function*
21.	H-OUTCOL	Horizontal Drive Output (Open Collector of the Internal Transistor)
22.	B+ OUT	B+ PWM Regulator Output
23.	SBLK OUT	Safety Blanking Output. Activated during frequency changes, when X-Ray input is triggered, when VS is too low, or when device is in Stand By mode (through H-Duty pin 2)
24.	VGND	Vertical Section Signal Ground
25.	VAGCCAP	Memory Capacitor for Automatic Gain Control Loop in Vertical Ramp Generator
26.	V_{REF}	Vertical Section Reference Voltage
27.	VCAP	Vertical Sawtooth Generator Capacitor
28.	VS-AMP	DC Control of Vertical S Shape Amplitude
29.	VS-CENT	DC Control of Vertical S Centering
30.	VOUT	Vertical Ramp Output (with Frequency Independent Amplitude and S-Correction)
31.	V-AMP	DC Control of Vertical Amplitude Adjustment
32.	V_{DCOUT}	Vertical Position Reference Voltage Output
33.	V-POS	DC Control of Vertical Position Adjustment
34.	VSYNC	Vertical TTL Sync Input
35.	PLL1INHIB	TTL Input for PLL1 Output Current Inhibition
36.	E/WOUT	East/West Pincushion Correction Parabola Output
37.	E/W-AMP	DC Control of East/West Pincushion Correction Amplitude
38.	KEYST	DC Control of Keystone Correction
39.	B+ADJ	DC Control of B+ Adjustment
40.	REGIN	Regulation Input of B+ Control Loop
41.	COMP	B+ Error Amplitude Output for Frequency Compensation and Gain Setting
42.	I_{SENSE}	Sensing of External B+ Switching transistor Emitter Current

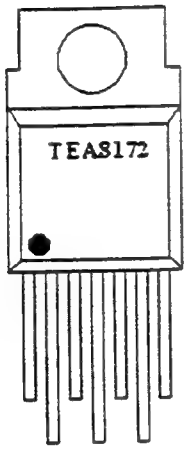

OUTPUT BUFFER
PULSE SHAPER
2nd PHASE COMP
LOCK DETECT
SAFETY PROCESSOR
VCO
1st PHASE COMP
INPUT INTERFACE
H VRU
BANDGAP
V VRU
PARABOLA GENERATOR
S CONNECTION
VERTICAL OSCILLATOR
INPUT INTERFACE

ii TEA8172

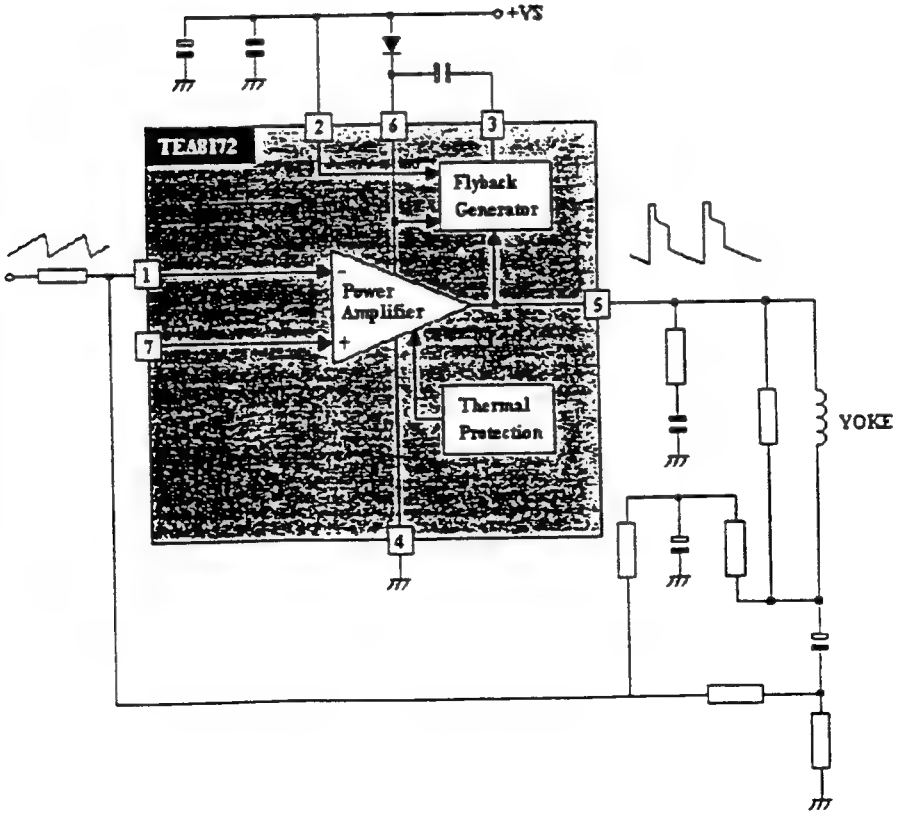
Description

The TEA8172 is a monolithic integrated circuit in HEPTAWATT™ package. It is a high efficiency power booster for direct driving of vertical windings of TV yokes. It is intended for use in Color and B & W television as well as in monitors and displays.

Block Diagram



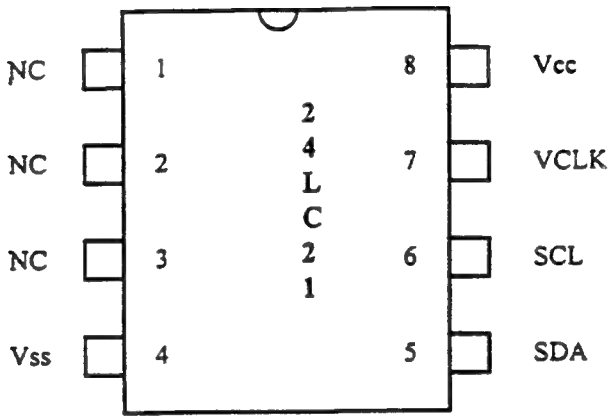
Pin 1: INVERTING INPUT
Pin 2: SUPPLY VOLTAGE
Pin 3: FLYBACK GENERATOR
Pin 4: GROUND
Pin 5: OUTPUT
Pin 6: OUTPUT STAGE SUPPLY
Pin 7: NON-INVERTING INPUT



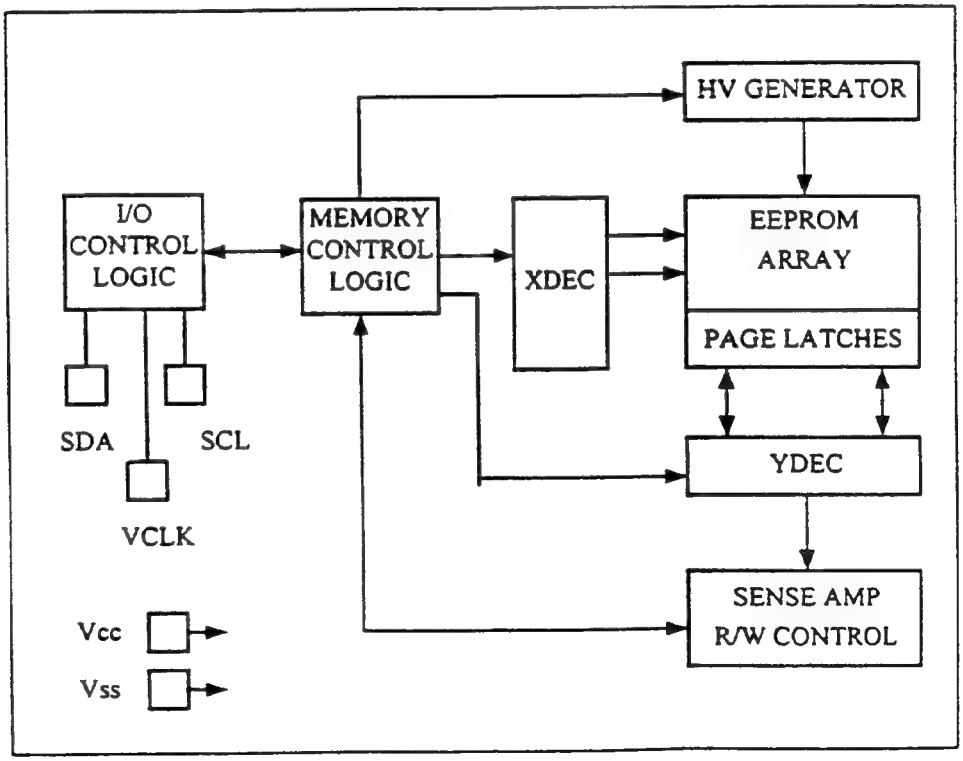
iii **24LC21**

1K 2.5V Dual Mode CMOS Serial EEPROM

The 24LC21 is a 128*8 bit Electric Erasable PROM. This device is designed for use in applications requiring storage and serial transmission of configuration and control information. Two modes of operation have been implemented: Transmit Only Mode and Bi-Directional Mode. Upon power-up, the device will be in the Transmit Only Mode, sending a serial bit stream of the entire memory array contents, clocked by the VCLK pin. A valid high to low transition on the SCL pin will cause the device to center the Bi-Directional Mode, with byte selectable read/write capability of the memory array.



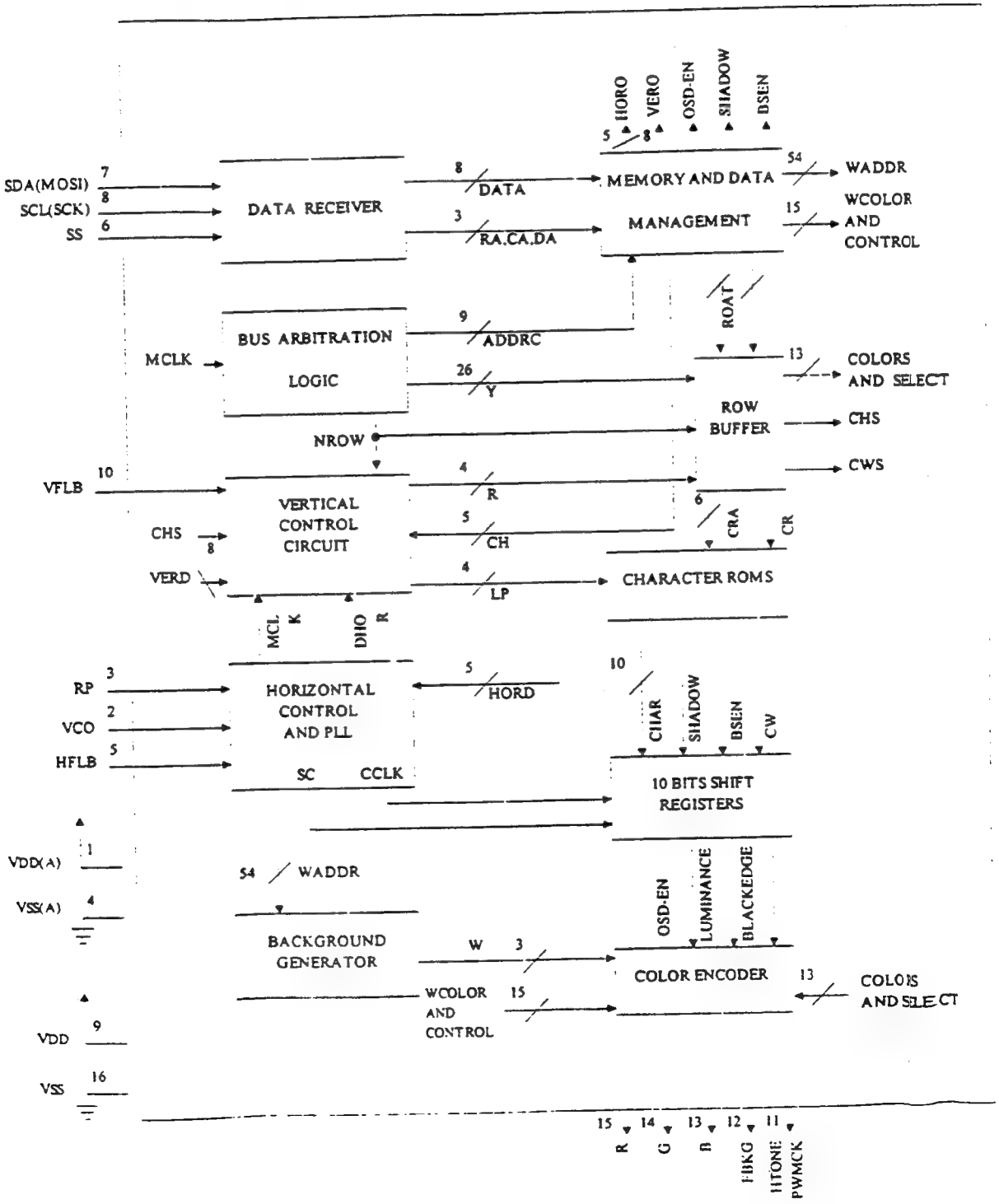
Block Diagram

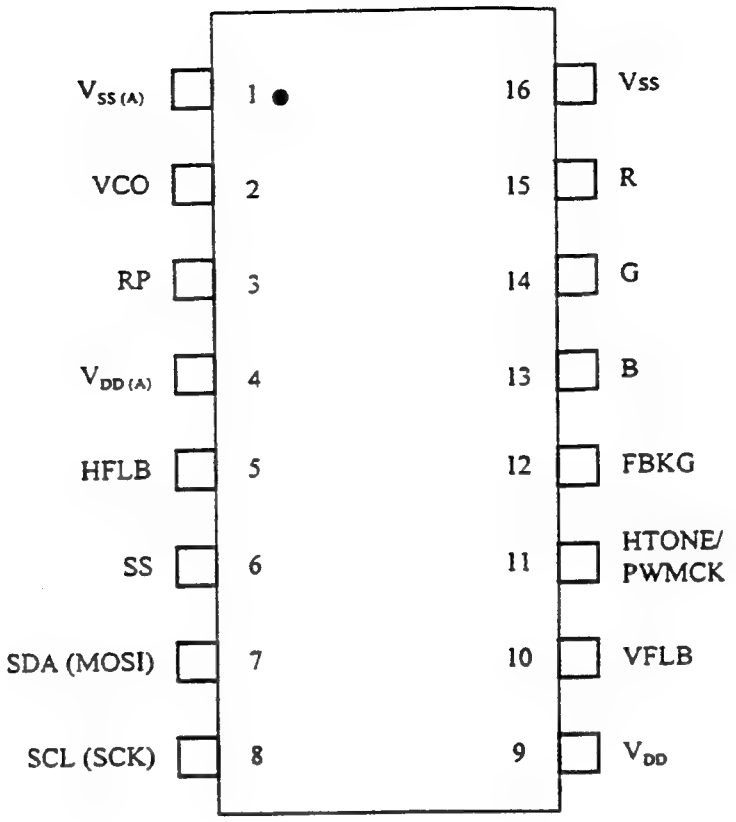


iv LSC4316PM

Advanced Monitor On-Screen Display

This is a high performance HCMOS device designed to interface with a microcontroller unit to allow colored symbols or characters to be displayed on a color monitor. Its on-chip PLL allows both multisystem operation and self generation of system timing. It also minimizes the MCU's burden through its built-in 493 bytes RAM. By storing a full screen of data and control information, this device has a capability to carry out 'screen-refresh' without any MCU supervision.





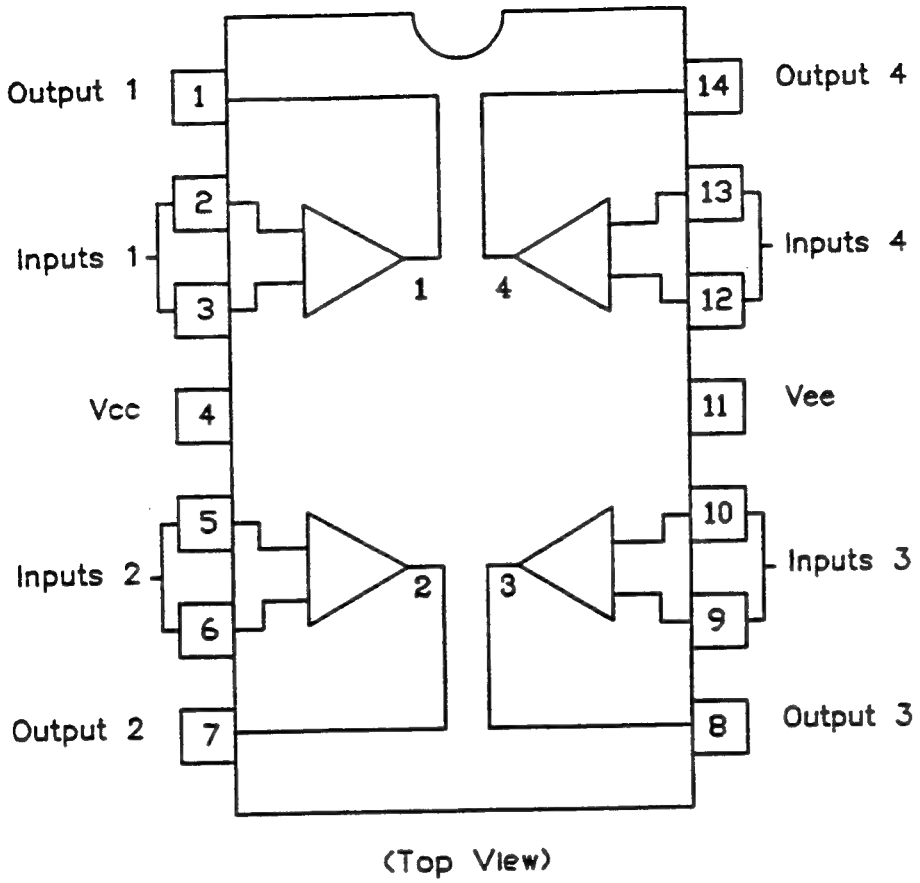
v **LM324**

QUAD Low Power Operational Amplifiers

The LM324 series are low-cost, quad operational amplifiers with true differential inputs. These have several distinct advantages over standard operational amplifier types in single supply applications. The quad amplifier can operate at supply voltage as low as 3.0 Volts or as high as 32 Volts with quiescent currents about one fifth of those associated with the MC1741 (on a per amplifier basis). The common mode input range includes the negative supply, thereby eliminating the necessity for external biasing components in many applications. The output voltage range also includes the negative power supply voltage.

- Short Circuited Protected Outputs
- True Differential Input Stage
- Single Supply Operation: 3.0 to 32 Volts
- Low Input Bias Currents: 100 nA Max
- Four Amplifiers Per Package
- Internally Compensated
- Common Mode Range Extends to Negative Supply
- Industry Standard Pinouts

Pin connection

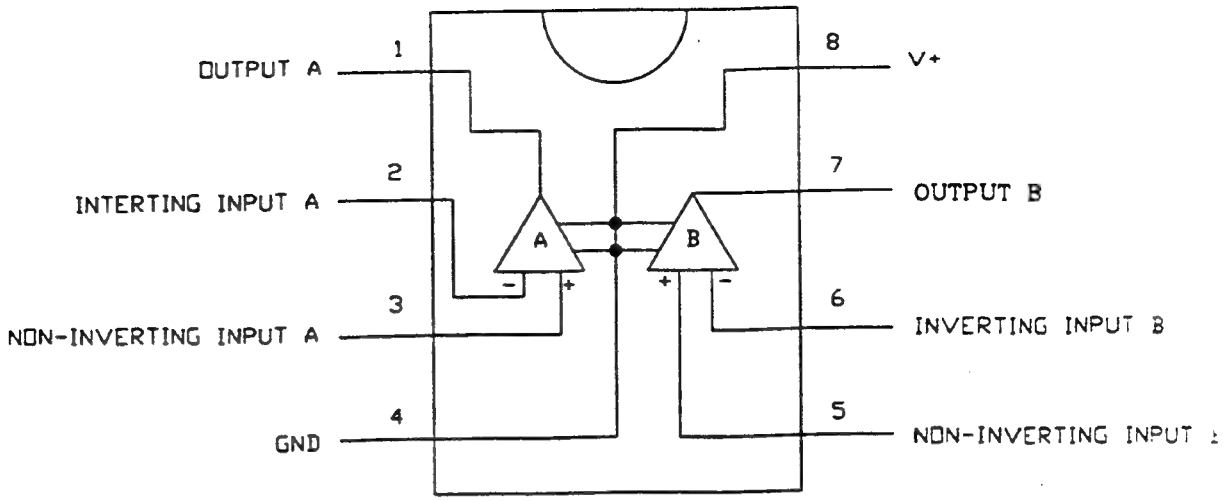


vi LM393A

Description

The LM393A consists of two independent precision voltage comparators with an offset voltage specification as low as 2.0 mV max. for two comparators which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. The comparator also has a unique characteristic in that the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

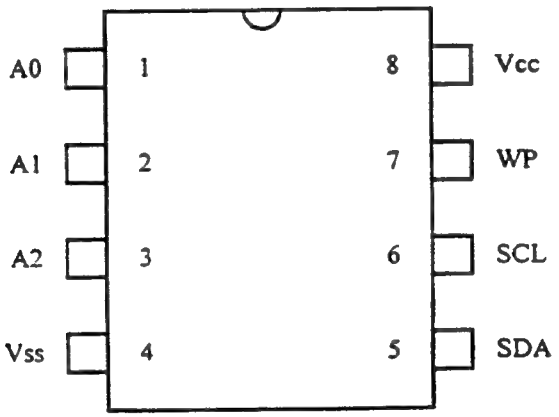
Application areas include limit comparators, simple analog to digital converters; pulse, squarewave and time delay generators; wide range VCO; MOS clock timers; multivibrators and high voltage digital logic gates. The LM393A was designed to directly interface with TTL and CMOS. When operated from both plus and minus power supplies, the LM393A will directly interface with MOS logic where their low power drain is a distinct advantage over standard comparators.



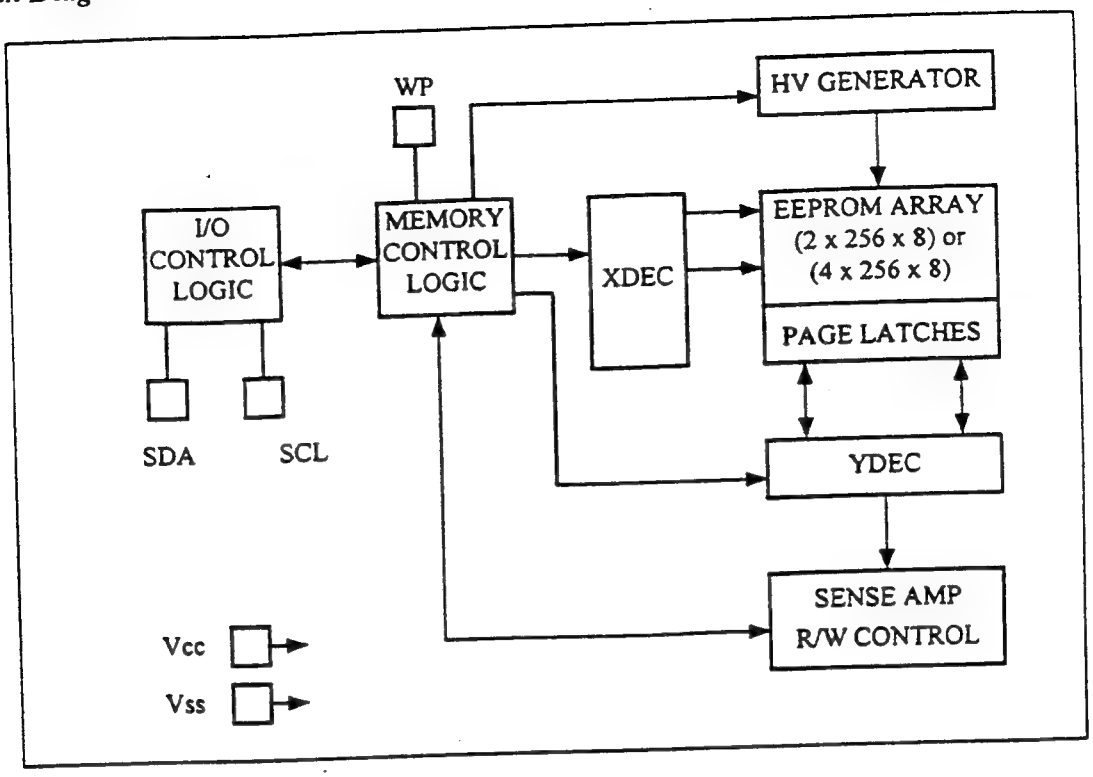
vii **24LC08B**

Description

24LC08 is a 8K-bit Electrically Erasable PROM. The device is organized as two or four blocks of 256 x 8 bit memory with two wire serial interface. Low voltage design permits operation down to 2.5volts with standby and active currents of only 5μA and 1mA respectively. The 24LC08 also has a page-write capability for up to 16 bytes of data.



Block Diagram



viii **74LS74 Dual D-Type Positive Edge-Triggered Flip-Flop**

Description

The 74LS74 dual edge-triggered flip-flop utilizes schottky TTL circuitry to produce high speed D-type flip-flops. It has individual clear and set inputs, and also complementary Q and $\overline{Q}$ outputs.

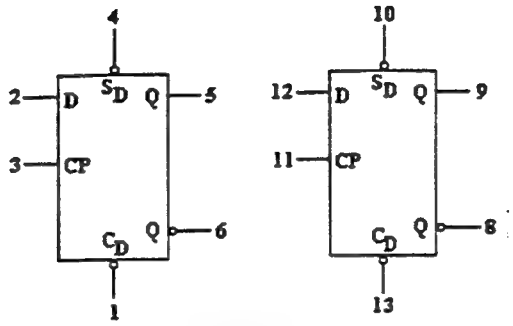
Information at input D is transferred to the Q output on the positive-going edge of the clock pulse and is not directly related to the transition time of the positive-going pulse. When the clock input is at either the HIGH or the LOW level, the D input signal has no effect.

Mode Select - Truth Table

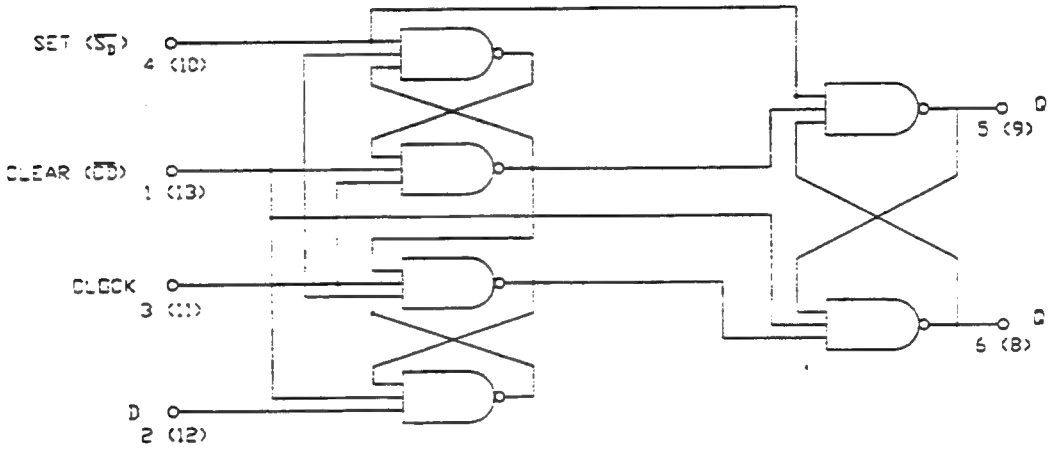
Operating Mode	Inputs			Outputs	
	$\overline{S}_D$	$\overline{S}_D$	D	Q	$\overline{Q}$
Set	L	H	X	H	L
Reset (Clear)	H	L	X	L	H
Undetermined	L	L	X	H	H
Load "1" (Set)	H	H	h	H	L
Load "0" (Reset)	H	H	l	L	H

- H, h = HIGH Voltage Level
- L, l = LOW Voltage Level
- X = Don't Care
- l, h (q) = Lower case letters indicate the state of the referenced input (or output) one set-up time prior to the HIGH to LOW clock transition.

Logic Symbol

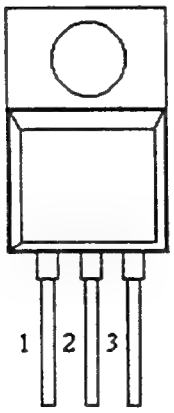


Vcc = pin 14
GND = pin 7



ix LM78XX Series Voltage Regulators

Pin Assignment



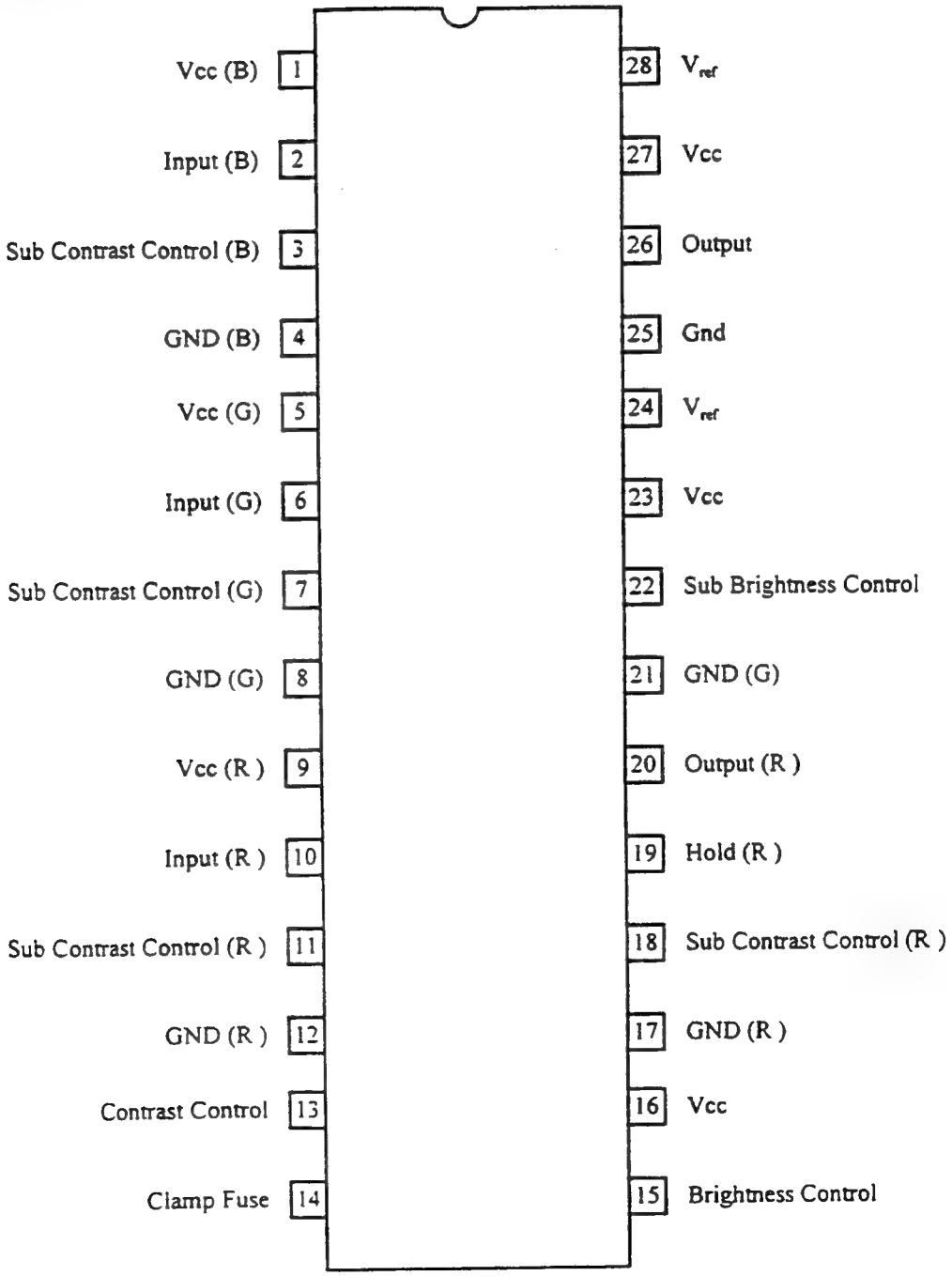
Pin 1: Input
Pin 2: GND
Pin 3: Output

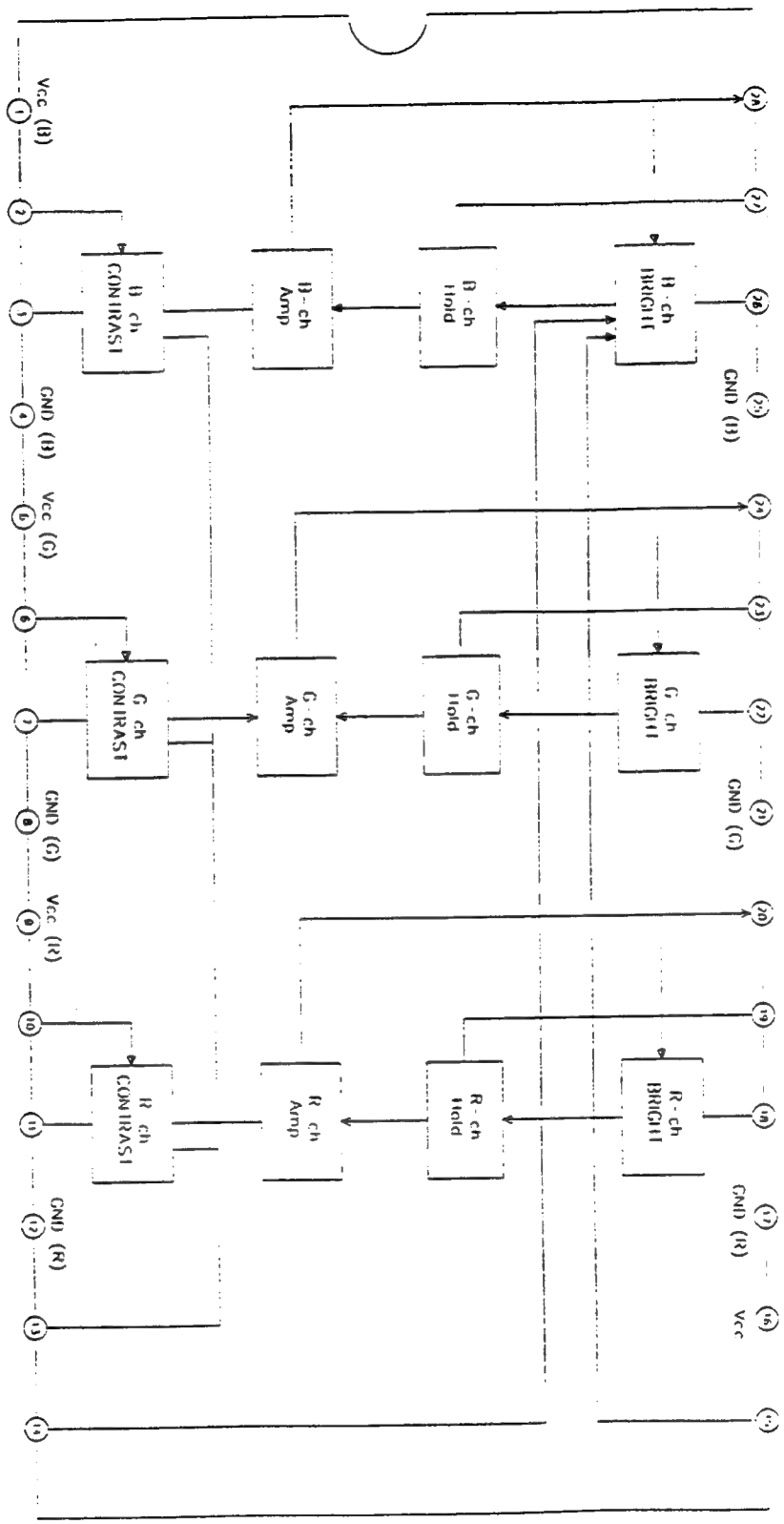
Description

The LM78XX series are three Terminal Positive Voltage Regulators including LM7805 which is a +5V regulator and LM7812 which is a +12V regulator. These voltage regulators are monolithic integrated circuits designed as fixed voltage regulators for a wide variety of applications including local, on-card regulation. These regulators employ current limiting, thermal shutdown, and safe-area compensation with adequate heatsinking. They can deliver output currents in excess of 1.0 Ampere. Although designed primarily as a fixed voltage regulator, these devices can be used with external components to obtain adjustable voltages and currents.

x **M52327SP**

Pin Configuration



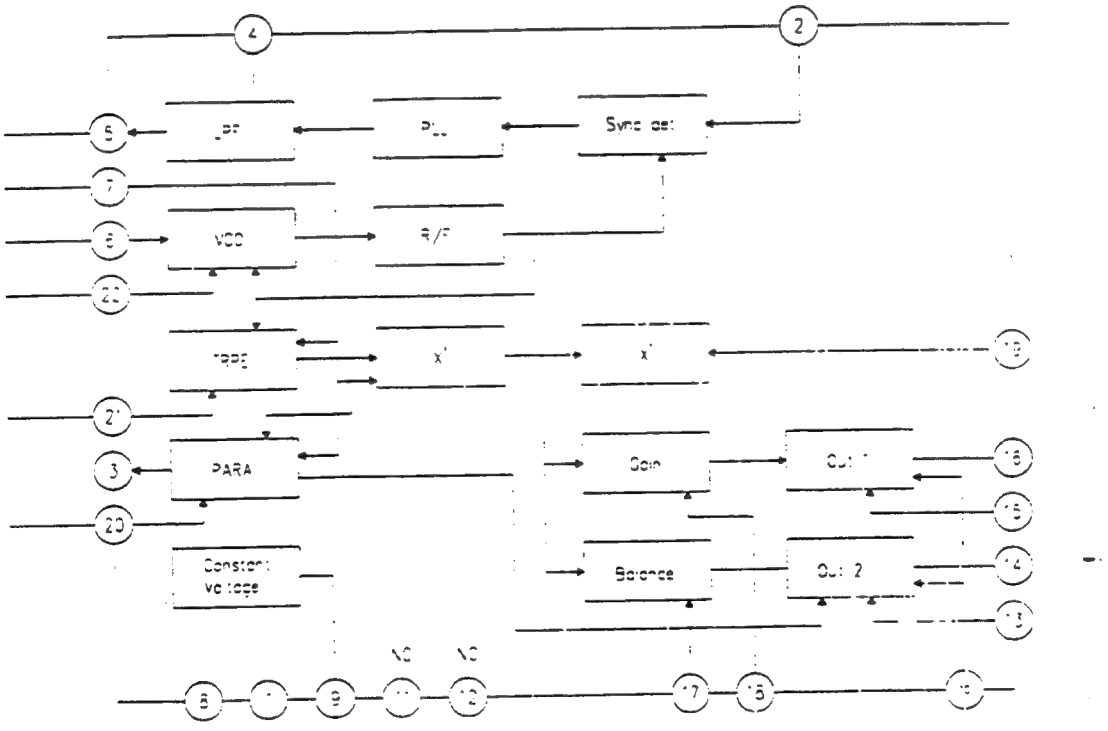

Vcc (B)
B-ch CONTRAST
B-ch Amp
B-ch Hold
B-ch BRIGHT
GND (B)
Vcc (G)
G-ch CONTRAST
G-ch Amp
G-ch Hold
G-ch BRIGHT
GND (G)
Vcc (R)
R-ch CONTRAST
R-ch Amp
R-ch Hold
R-ch BRIGHT
GND (R)
Vcc

xi AN5766K

Pin Function Description

Pin No.	Pin Description	Pin No.	Pin Description
1.	GND	12.	NC
2.	Vertical Sync. Signal input	13.	DC bias input for Ramp output
3.	Bias output for RAMP output	14.	Ramp output
4.	LPF	15.	DC bias input for parabola output
5.	Charge pump output	16.	Parabola output
6.	VCO control input	17.	Parallelogram amplitude control
7.	VCO capacitor	18.	Side pin amplitude control
8.	Vcc (+12V)	19.	Corner correction control
9.	Bias output (6V)	20.	Parallelogram correction control
10.	DC offset	21.	Trapezoid correction control
11.	NC	22.	Center position correction control

Block Diagram



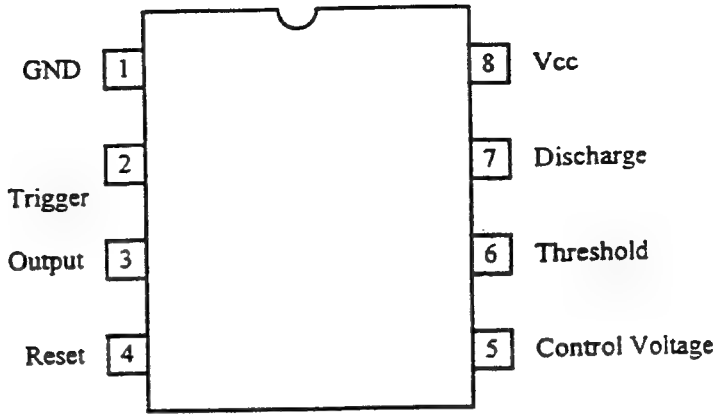
xii NE555

Description

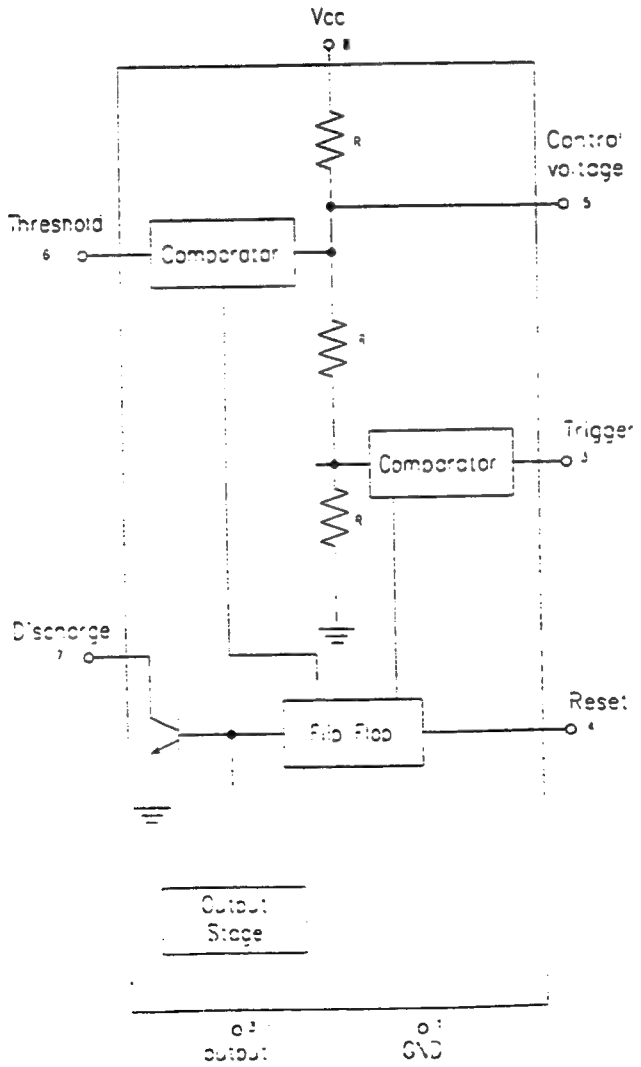
The 555 monolithic timing circuit is a highly stable controller capable of producing accurate time delays, or oscillation. In the time delay mode of operation, the time is precisely controlled by one external resistor and capacitor. For a stable operation as an oscillator, the free running frequency and the duty cycle are both accurately controlled with two external

resistors and one capacitor. The circuit may be triggered and reset on falling waveforms, and the output structure can source or sink up to 200mA.

Pin Configuration



Block Diagram

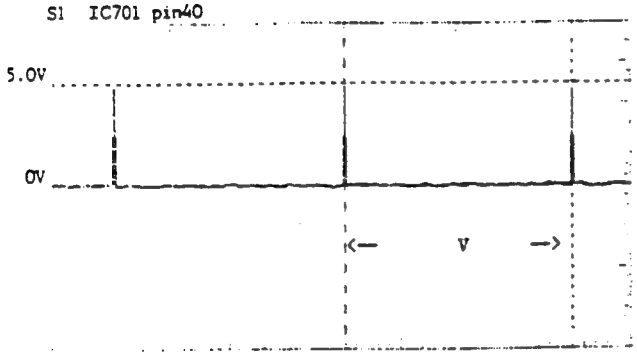


3. *Waveform*

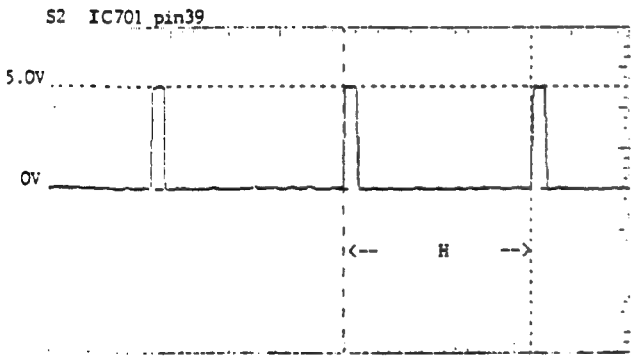
Test Condition:

H = 60.023 KHz
V = 75.029 Hz
Resolution = 1024 x 768
All in full white pattern

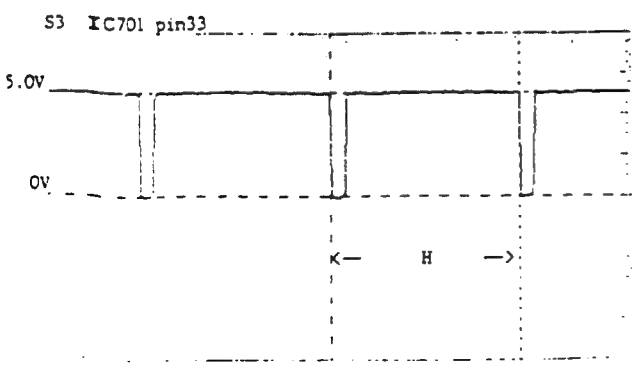
S1 IC701 pin40



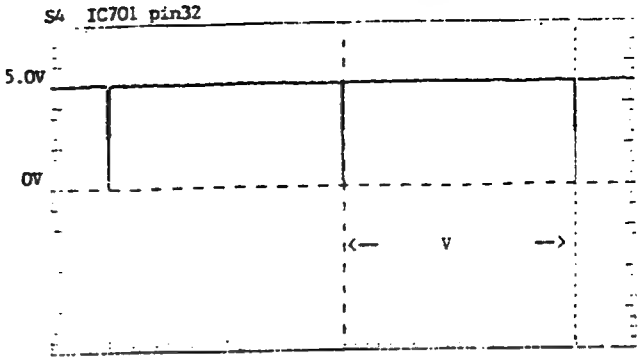
S2 IC701 pin39



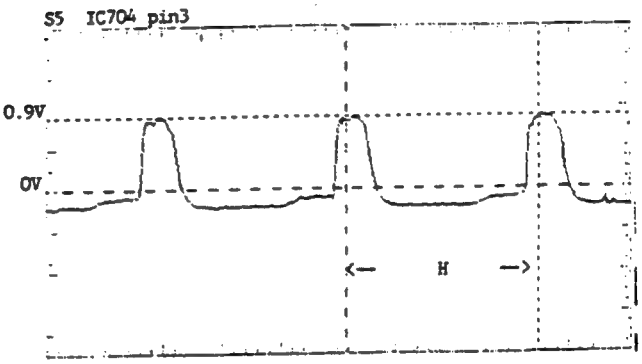
S3 IC701 pin33



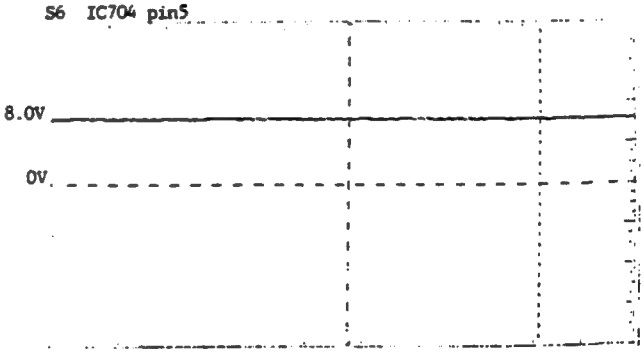
S4 IC701 pin32



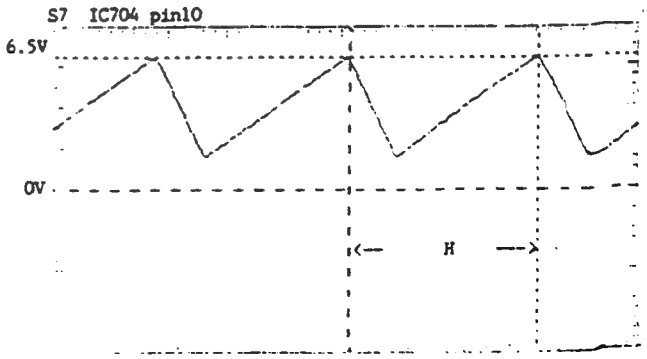
S5 IC704 pin3



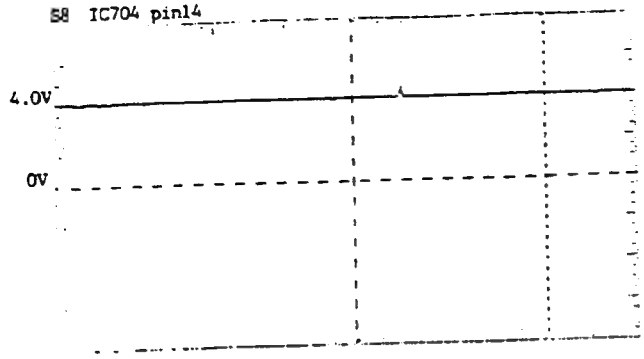
S6 IC704 pin5



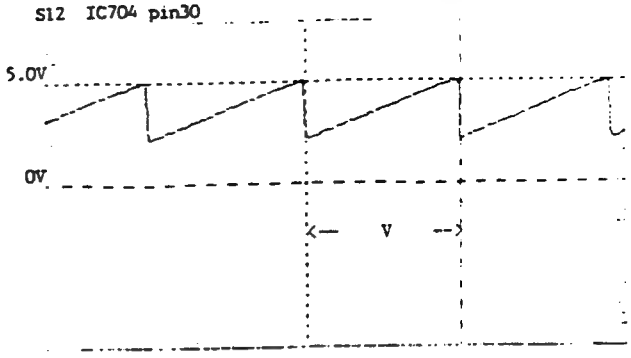
S7 IC704 pin10



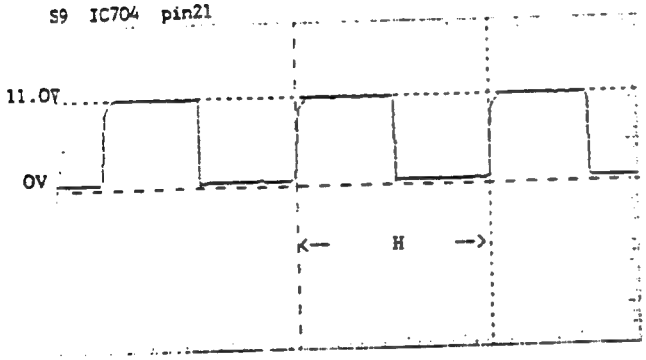
S8 IC704 pin14



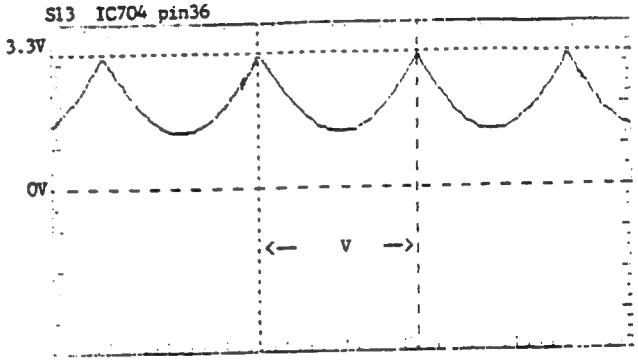
S12 IC704 pin30



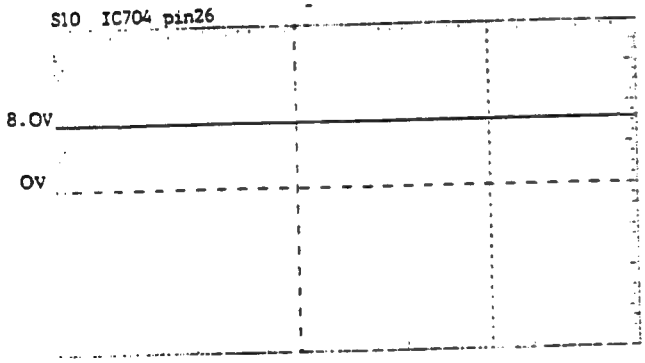
S9 IC704 pin21



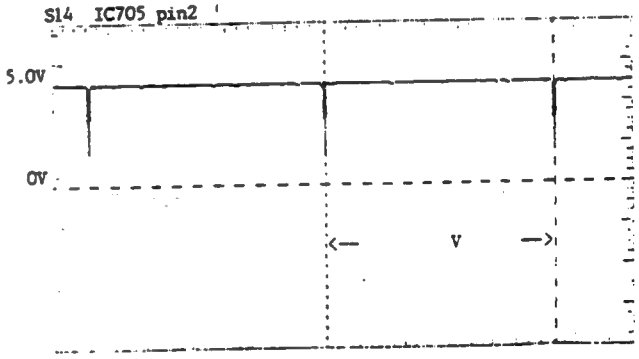
S13 IC704 pin36



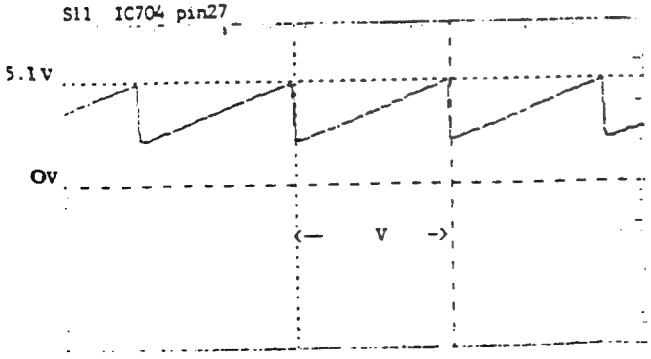
S10 IC704 pin26



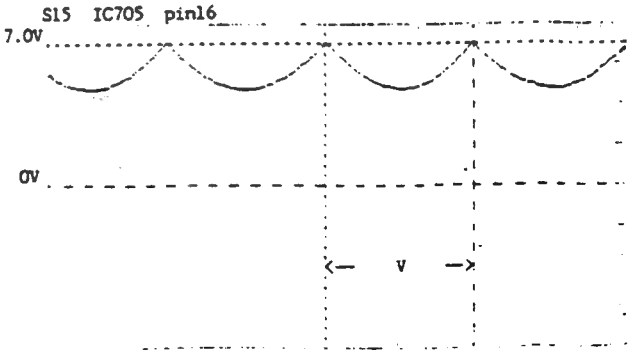
S14 IC705 pin2



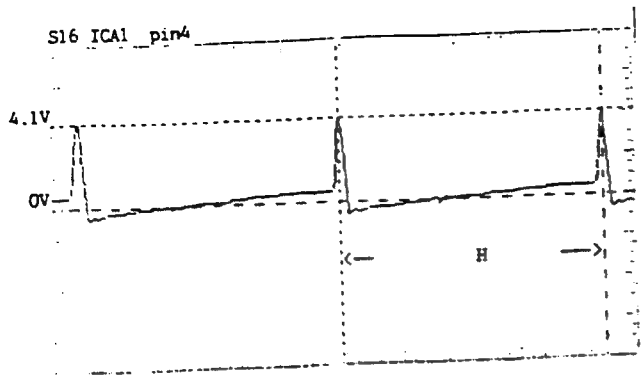
S11 IC704 pin27



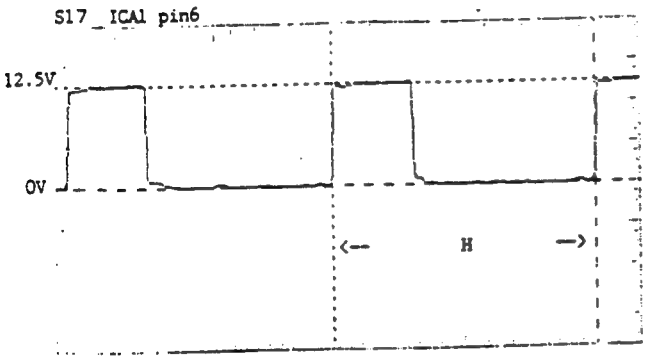
S15 IC705 pin16



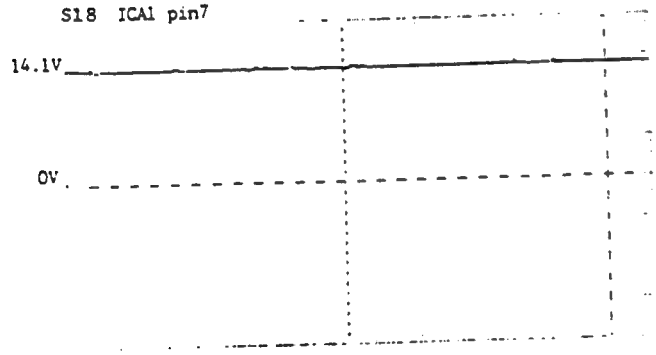
S16 IC A1 pin4



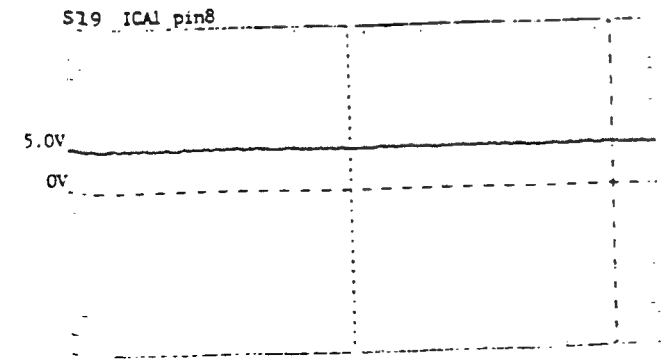
S17 IC A1 pin6



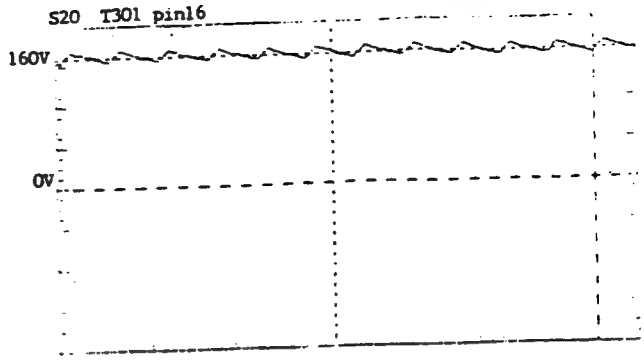
S18 IC A1 pin7



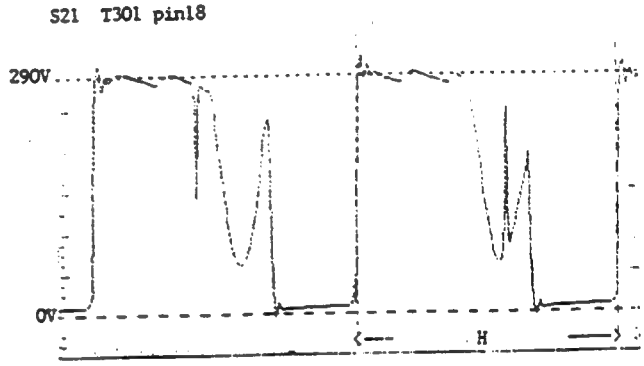
S19 IC A1 pin8



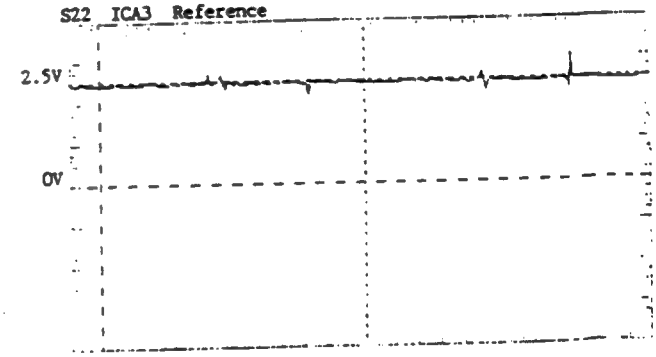
S20 T301 pin16



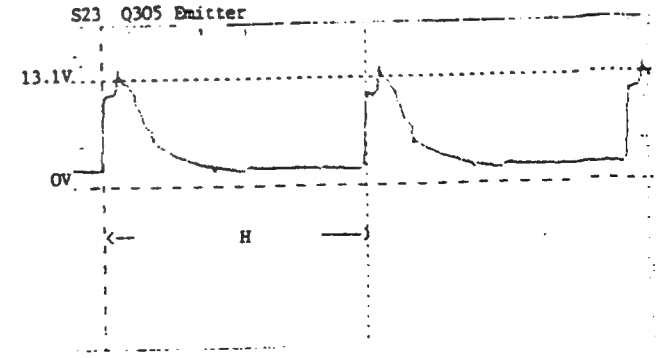
S21 T301 pin18



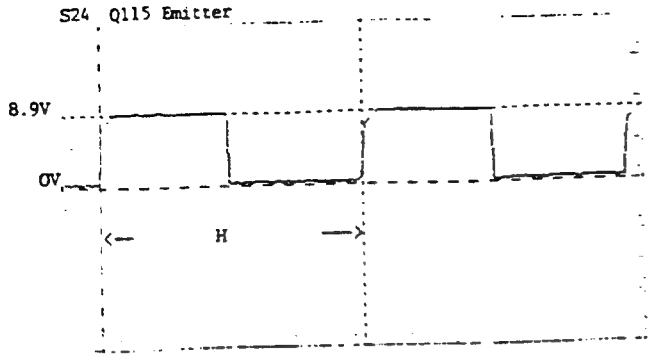
S22 IC A3 Reference



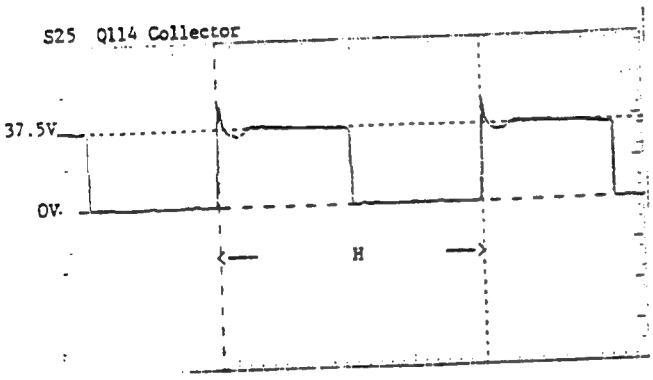
S23 Q305 Emitter



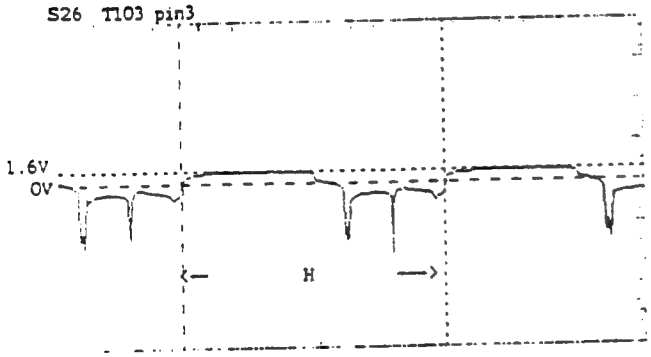
S24 Q115 Emitter



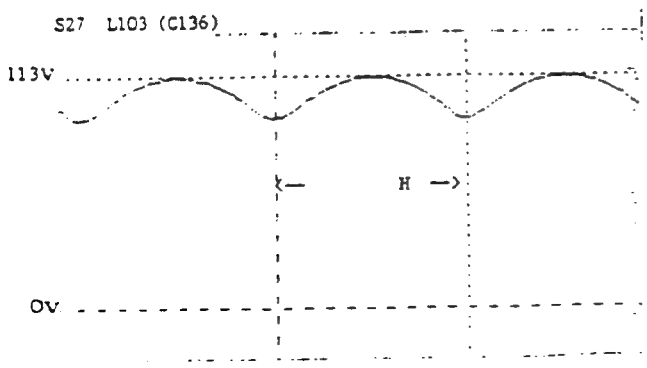
S25 Q114 Collector



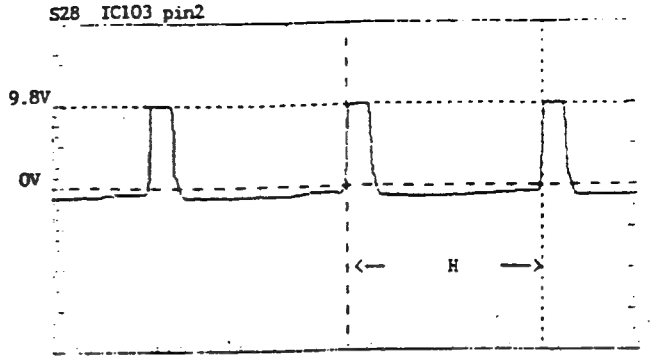
S26 T103 pin3



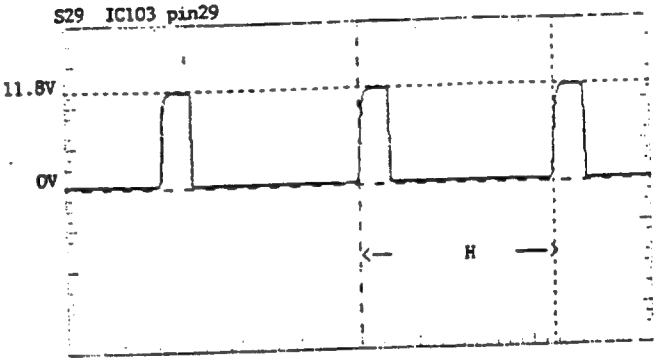
S27 L103 (C136)



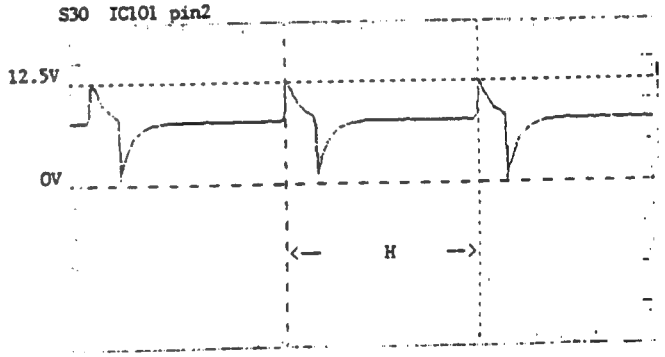
S28 IC103 pin2



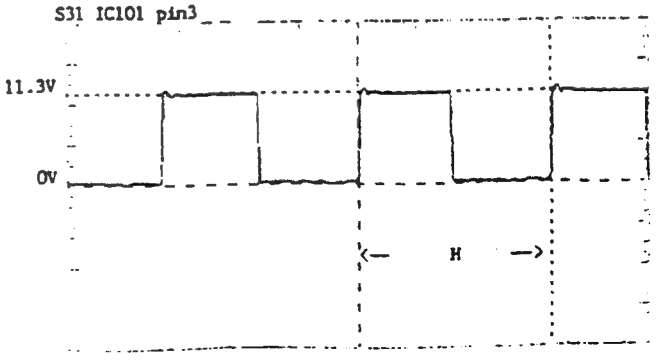
S29 IC103 pin29



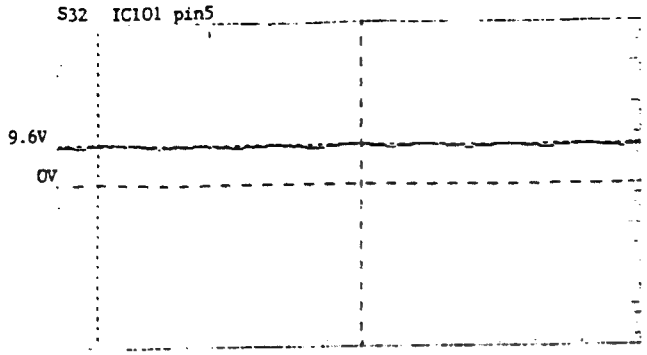
S30 IC101 pin2



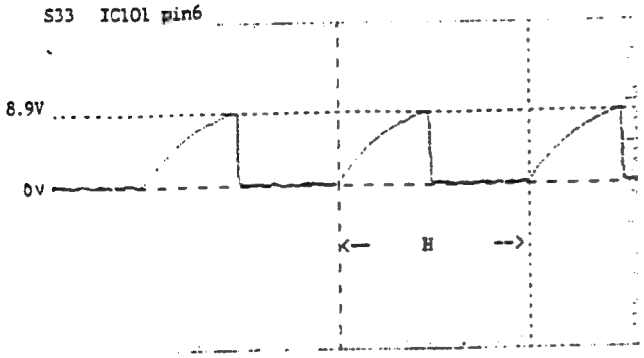
S31 IC101 pin3



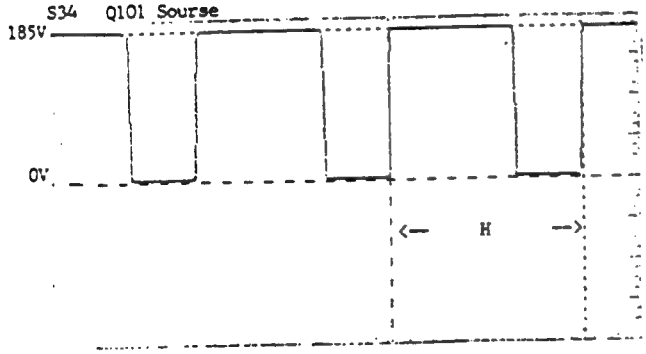
S32 IC101 pin5



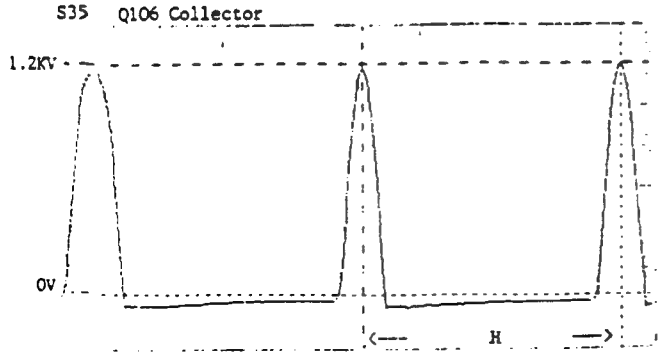
S33 IC101 pin6



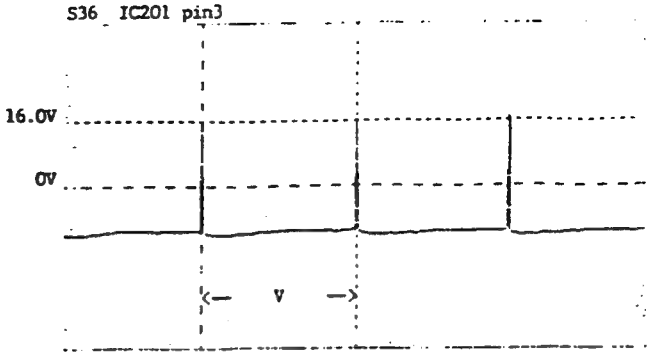
S34 Q101 Sourse



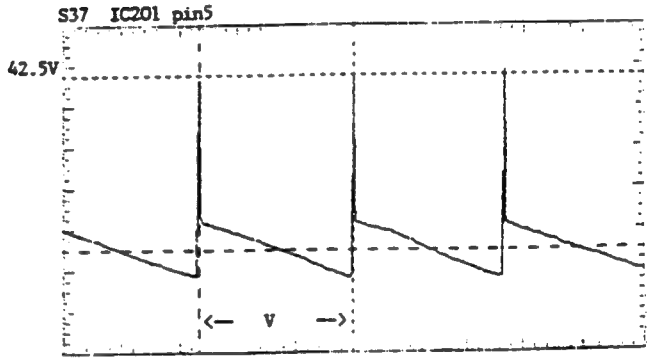
S35 Q106 Collector



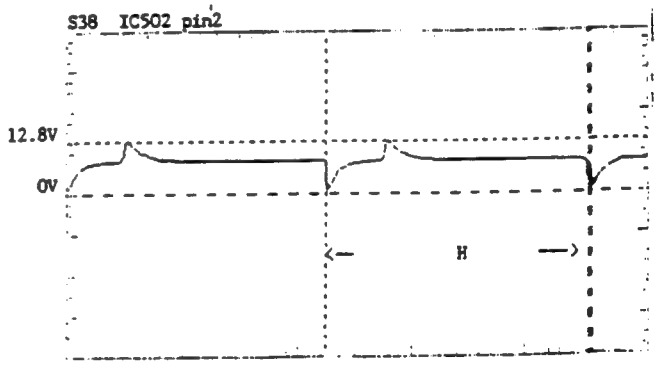
S36 IC201 pin3



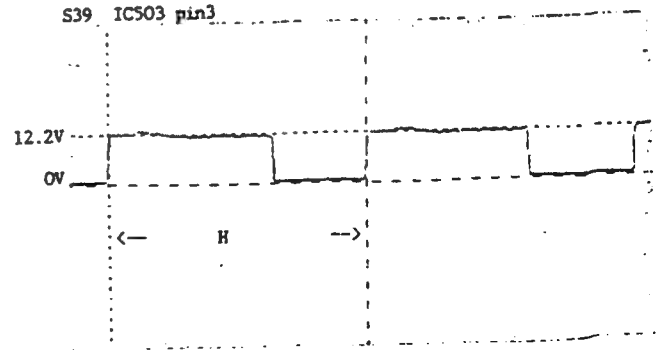
S37 IC201 pin5



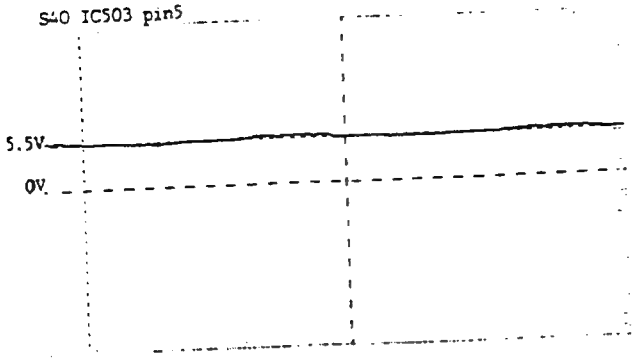
S38 IC502 pin2



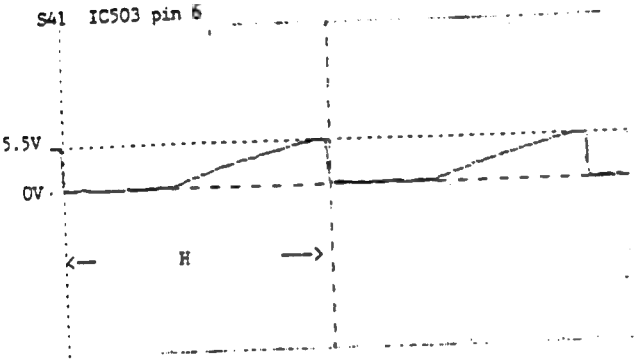
S39 IC503 pin3



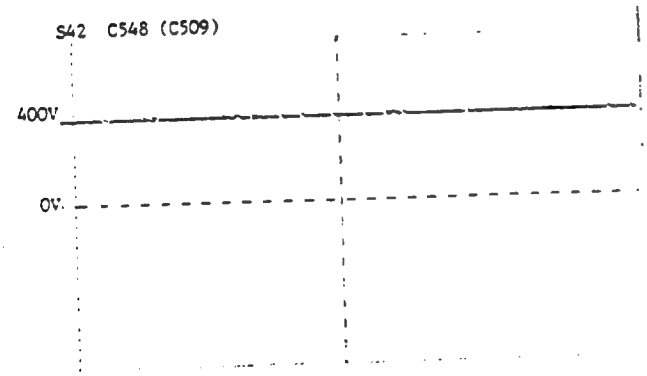
S40 IC503 pin5



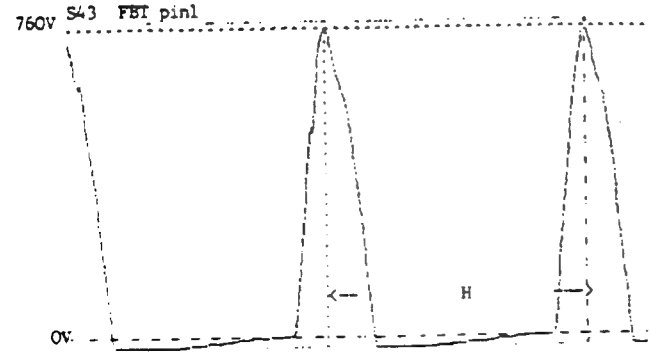
S41 IC503 pin 6



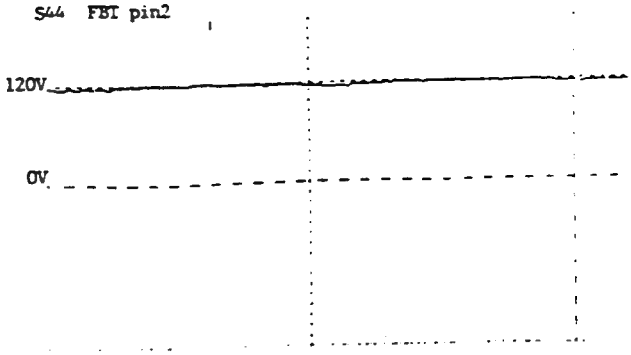
S42 C548 (C509)



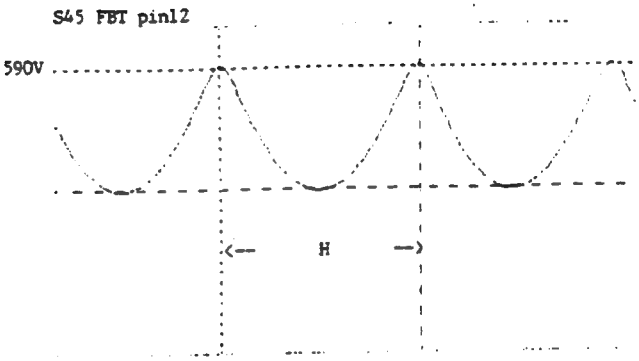
S43 FBT pin1



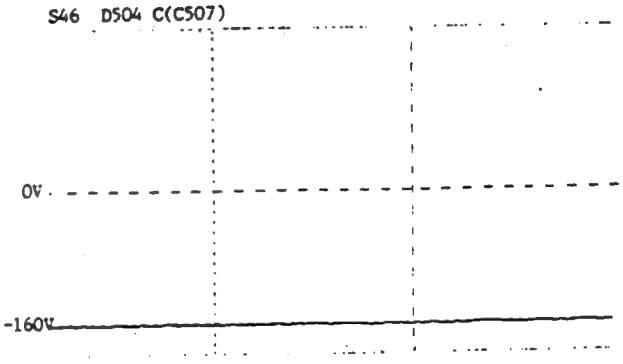
S44 FBT pin2



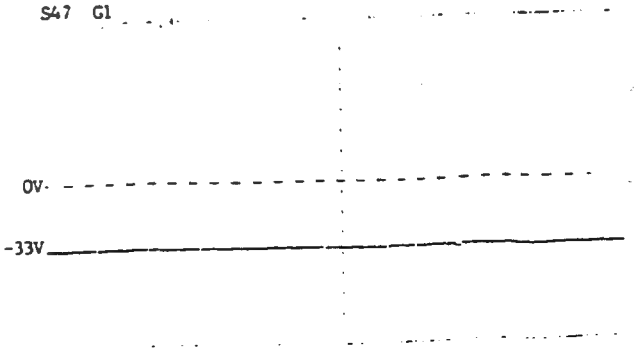
S45 FBT pin12



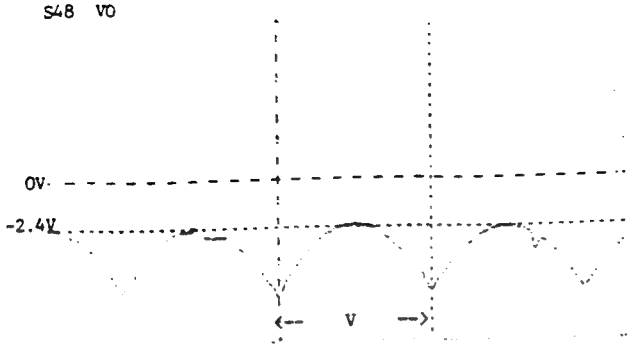
S46 D504 C(C507)



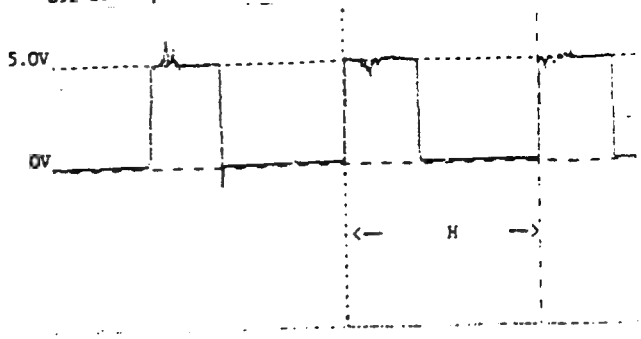
S47 G1



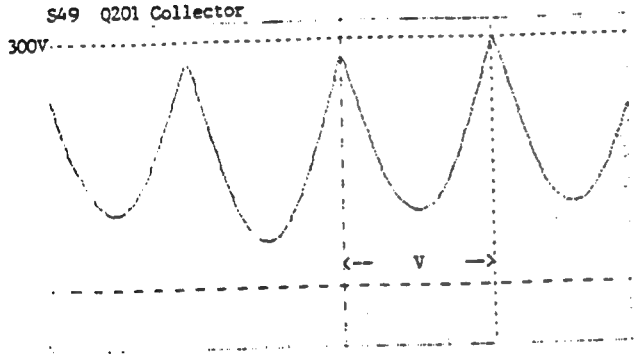
S48 VO



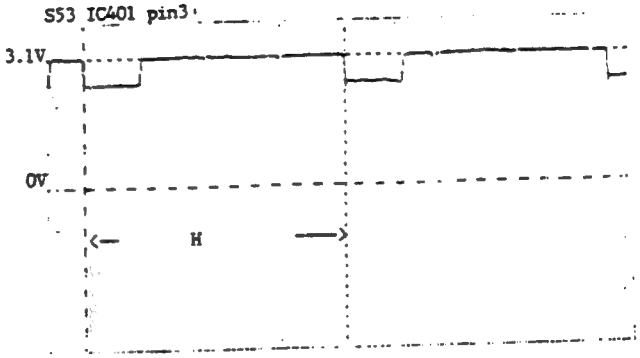
S52 IC402 pin15 on OSD condition



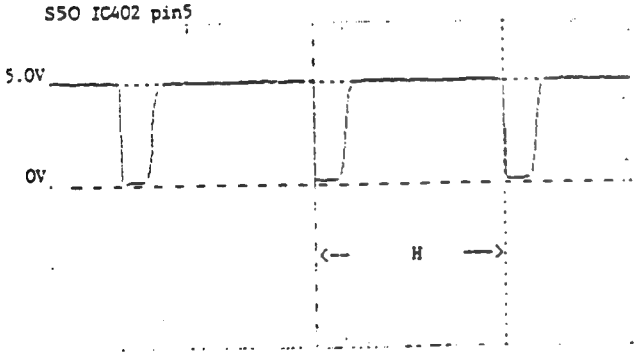
S49 Q201 Collector



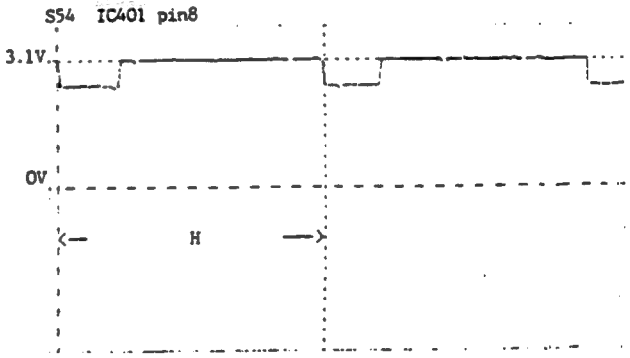
S53 IC401 pin3



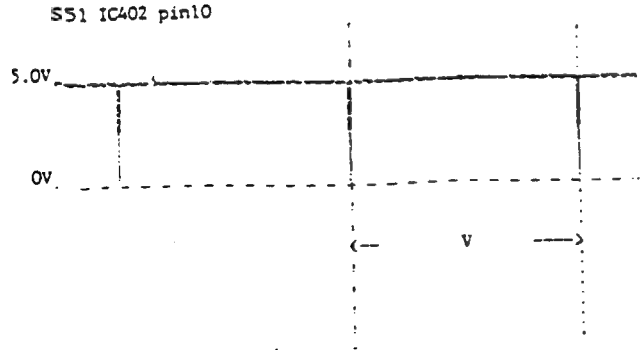
S50 IC402 pin5



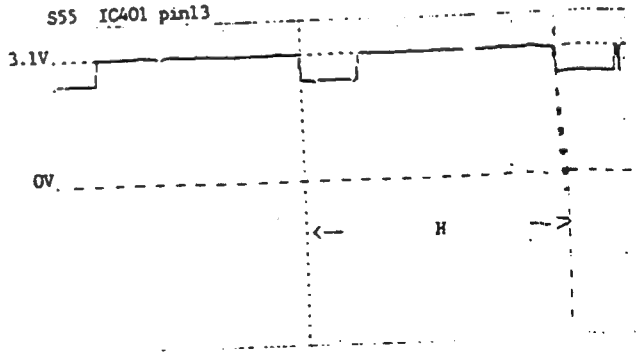
S54 IC401 pin8



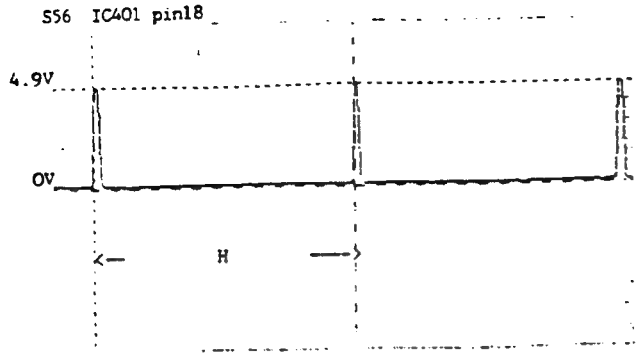
S51 IC402 pin10



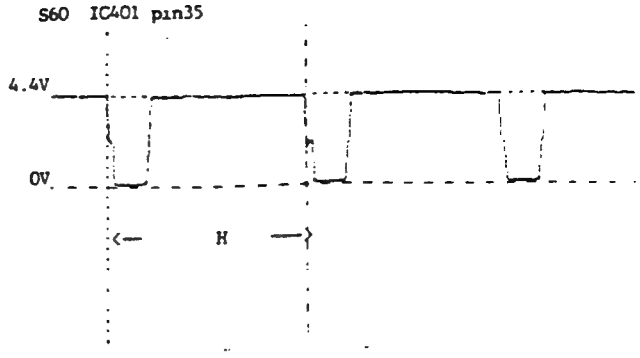
S55 IC401 pin13



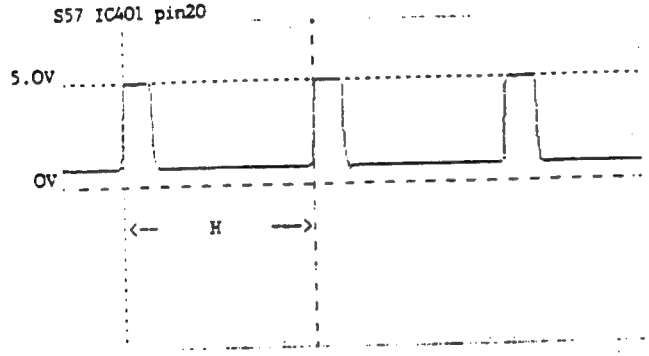
S56 IC401 pin18



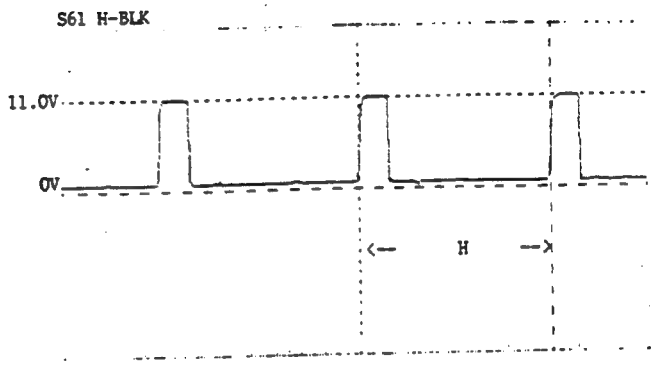
S60 IC401 pin35



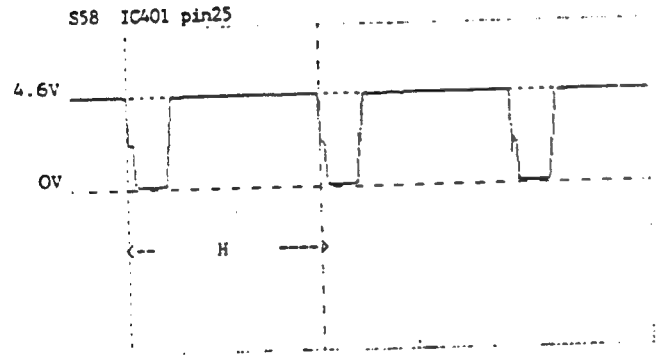
S57 IC401 pin20



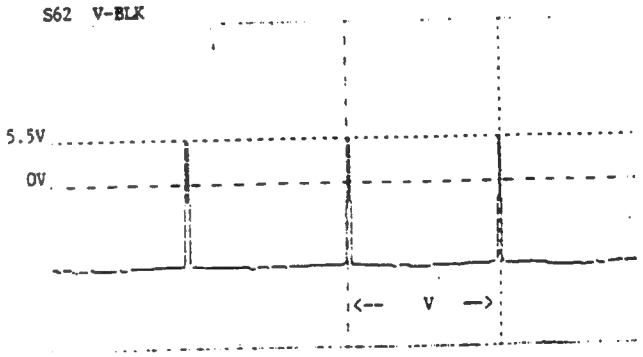
S61 H-BLK



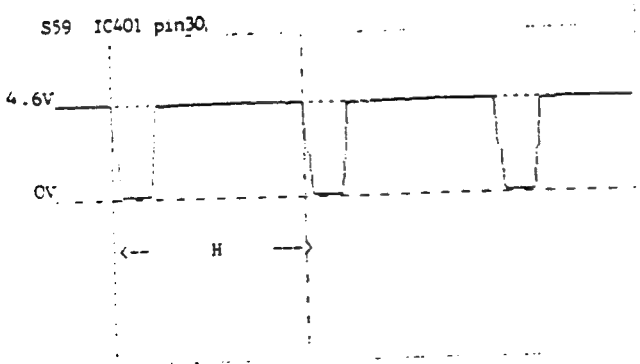
S58 IC401 pin25



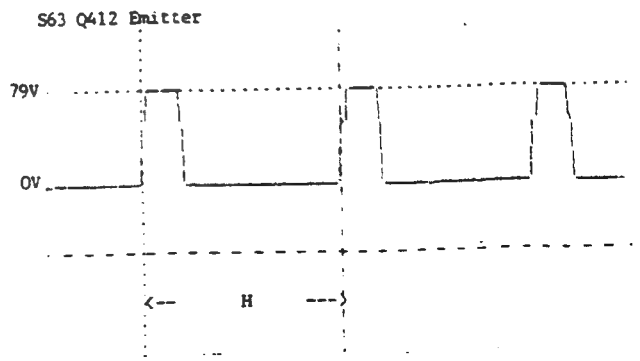
S62 V-BLK



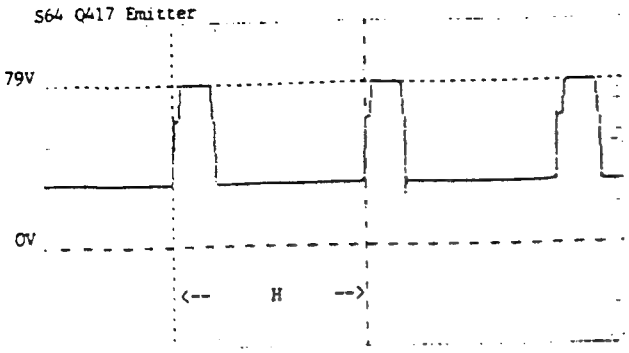
S59 IC401 pin30



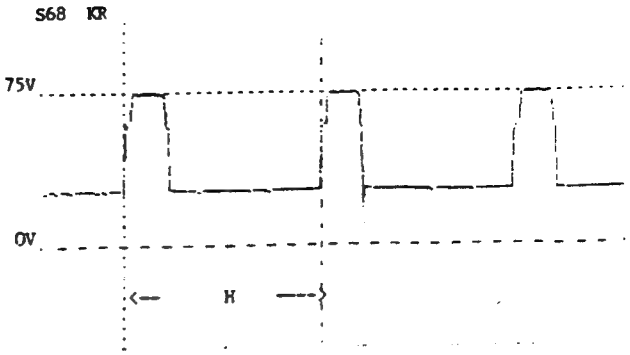
S63 Q412 Emitter



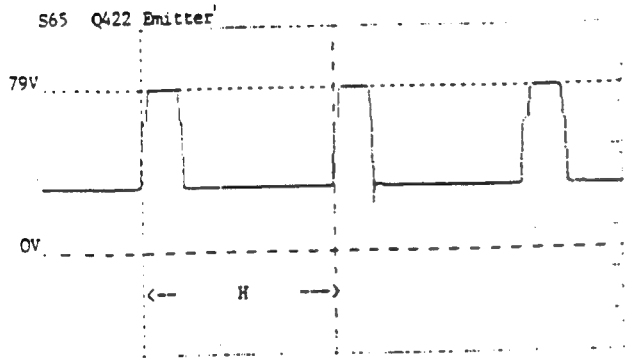
S64 Q417 Emitter



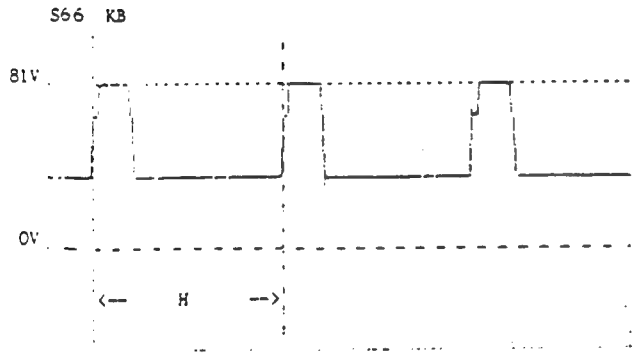
S68 KR



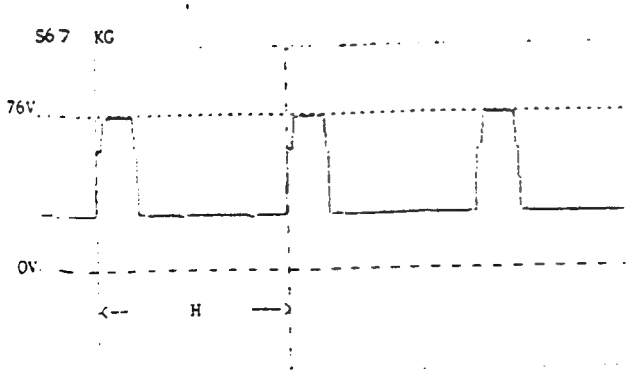
S65 Q422 Emitter



S66 KB



S67 KG



Chapter Six : Detailed Alignment Procedure

****Before making any adjustment, the monitor should be continually warmed up for at least 30 minutes.**

****The monitor should be orientated towards the East while doing alignment.**

The location of all VRs on Main Board is shown in Figure 6.1.

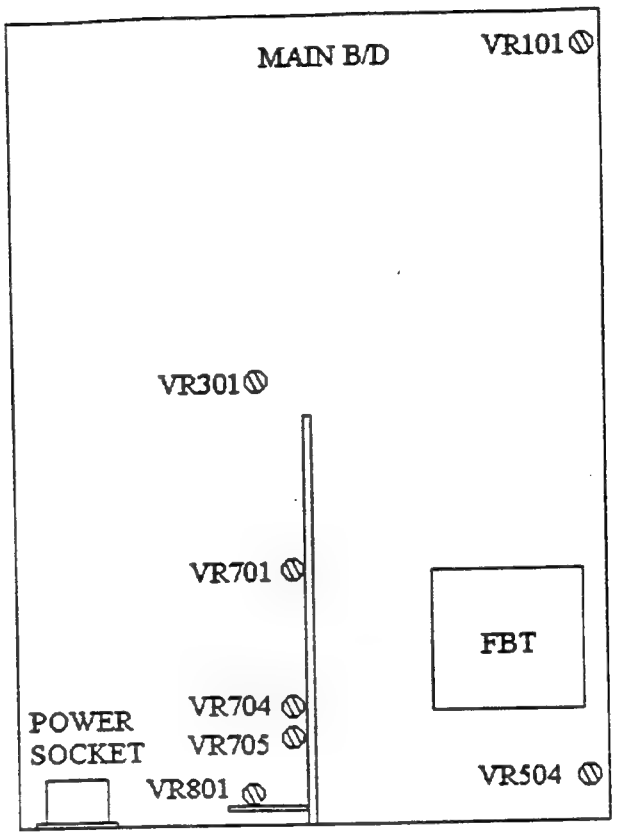
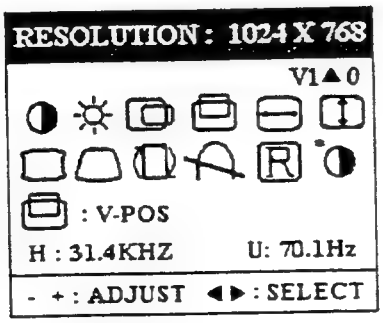
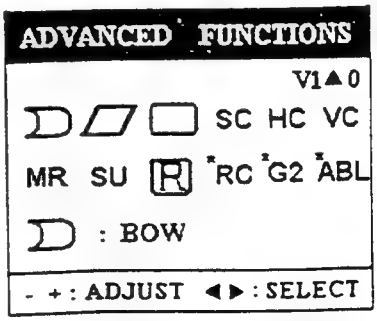
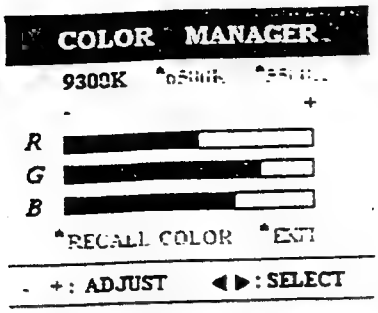


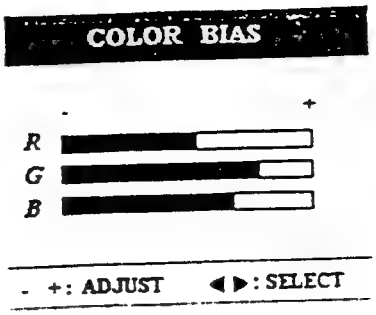
Fig6.1

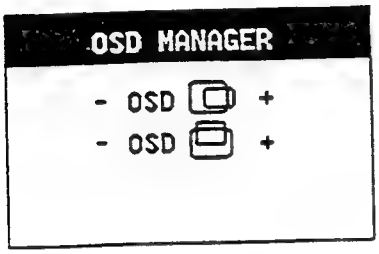
Menus for alignment are slightly different from those in chapter two. Please refer to the menus, and notes below.











Note:

1. ***Asterisked items are not visible when not selected.***
2. ***Asterisked Contrast is for Video Gain Adjustment.***
3. ****RC: for Raster center adjustment.***
4. ****G2: for Raster (background light) adjustment.***
5. ****ABL: for Auto Beam-current Limit adjustment***

1. Regulation of Supplied voltage

Condition : input -	Horizontal frequency	= 60.02KHz;
	Vertical frequency	= 75.00Hz;
	Resolution	= 1024x768;
	Pattern	= cross hatch pattern;
	Brightness	= minimum;
	Contrast	= minimum;

* Before making the following adjustments, please choose **Recall** Ⓡ function on OSD Main Menu to recall the factory preset.

  Adjust VR301 to make sure the voltage of **185V O/P** at D314's "-" lead is in the range of 185V±0.2V DC.

2. Regulation of Hi-Voltage and X-ray Protection

Condition : input -	Horizontal frequency	= 60.02KHz;
	Vertical frequency	= 75.00Hz;
	Resolution	= 1024*768;
	Pattern	= cross hatch pattern;
	Brightness	= minimum;
	Contrast	= minimum;

* Before making the following adjustments, please choose **Recall** Ⓡ function on OSD Main Menu to recall the factory preset.

1. Before adjusting Hi-Voltage, use the Hi-Voltage probe to check if there is leakage current nearby FBT and CRT Hi-Voltage anode.
2. Turn off the monitor and insert the Hi-Voltage probe to CRT anode to ensure a good ground connection from electric shock..
3. Turn on the monitor, and adjust VR102 to increase Hi-Voltage gradually to active the threshold of x-ray protection in which the monitor will shut down immediately. Make sure that the threshold of x-ray protection is active between 29.5kV and 32kV.
4. Turn off power and set VR102 to its Hi-Voltage minimum and restart the monitor.
5. Readjust VR102 to make sure Hi-Voltage is in the range of 26.0kV±0.2kV.

Note: Normally the Hi-Voltage is about 26.5kV. When something is wrong inside monitor, the Hi-Voltage may increase and produce higher x-ray radiation that is harmful to the human body. To prevent this, an extra circuit has been added to trigger x-ray protection when the Hi-Voltage works abnormally.

3. *Improvement for the Tilt of the CRT*

Condition: input -	Horizontal frequency	= 60.02kHz;
	Vertical frequency	= 75.00Hz;
	Resolution	= 1024*768;
	Pattern	= cross hatch pattern;

* Before making this adjustment, press "+" & "-" buttons simultaneously for 4 seconds when power on. It enables you to enter MAG factory preset state. After adjustments, turn the monitor off to save the changes.

1. Check the tilt of the video display to make sure that it is in compliance with the specification of 1.5mm on the top side and 2.0mm on the bottom side.
2. If it is not compliant with the specification, please choose **Rotation** function from OSD Menu. Then, set the tilt at good condition.

4. *Adjustment for the Geometric Distortion*

Condition: input -	Horizontal frequency	= 60.02kHz;
	Vertical frequency	= 75.00Hz;
	Resolution	= 1024*768;
	Pattern	= cross hatch pattern;

* Before making this adjustment, press "+" & "-" buttons simultaneously for 4 seconds when power on. It enables you to enter MAG factory preset state. After adjustments, turn the monitor off to save the changes.

1. Choose **RC** (raster center) hidden function from OSD ADVANCED functions. Center the raster center horizontally.
2. Choose **H-Size** function from OSD Main Menu. Set the scale bar to 50, then adjust VR101 on Main B/D so that the horizontal size is in the range of 300mm±5mm.
3. For other geometric alignment, please refer to Chapter two for detailed information.

5. *Adjustment for the White Balance and Brightness*

Condition: input -	Horizontal frequency	= 60.02kHz;
	Vertical frequency	= 75.00Hz;
	Resolution	= 1024*768;
	Pattern	= center block white pattern;

* Before making this adjustment, press "+" & "-" buttons simultaneously for 4 seconds when power on. It enables you to enter MAG factory preset state. After adjustments, turn the monitor off to save the changes.

(a) Adjustment for Raster White Balance

1. Set the **Brightness** ☼ function to its maximum, and **Contrast** ◑ function to its minimum on OSD Main Menu.
2. Choose Color Bias from OSD Menu.
3. Adjust R, G, B so that x = 0.281±10%, y = 0.311±10% on your analyzer.
4. Adjust G2 function from OSD Main Menu so that the Raster (background light) is 1±0.2FL.

(b) Adjustment for Video White Balance

1. Input center block white pattern.
2. Set the **Brightness** ☼ function to its minimum, and **Contrast** ◑ function to its maximum on OSD Main Menu.
3. Choose Color Manager from OSD Menu.
4. Adjust each Video Gain to make sure that
   x = 0.281±10%, y = 0.311±10% at 9300K
   x = 0.313±10%, y = 0.329±10% at 6500K
   x = 0.332±10%, y = 0.348±10% at 5500K
5. Adjust G2 function so that the Raster (background light) is 0.7±0.2FL.

(c) Brightness Adjustment

1. Input central block white block pattern.
2. Adjust both **Contrast** ◑ and **Brightness** ☼ function to their maximum.
3. Choose Hidden Contrast function from OSD Main Menu, then adjust the center white block pattern at the range of 51FL-60FL.

(d) ABL (Auto Beam-current limit) Setting

1. Input full white pattern.
2. Choose hidden ABL function from OSD ADVANCED Functions, then adjust it so that the brightness is clapped at the range of 35.5 ~ 40.5FL.

6. *Adjustment for Focus and Convergence (CG)*

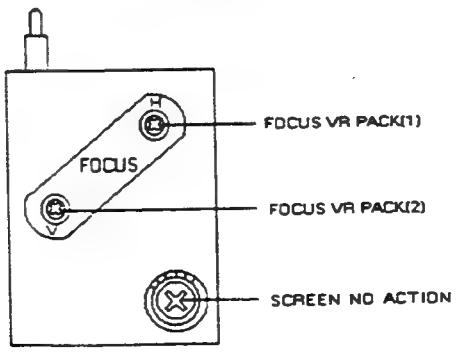


Figure 6.3

(a) Focus Adjustment

Condition: input -

Horizontal frequency	= 60.02kHz;
Vertical frequency	= 75.00Hz;
Resolution	= 1024*768;
Pattern	= letter "H" pattern; cross hatch pattern;

* Before making the following adjustments, please press **Recall** function on OSD Menu to recall the factory preset.

Adjust the FOCUS VRs on the FBT to make both the horizontal and vertical lines of cross hatch pattern and the letter "H" pattern as clear as possible.

1. Adjust the FOCUS VR(1) PACK such that the horizontal lines of the patterns become clear.
2. Adjust the Focus VR(2) PACK such that the vertical lines of the patterns become clear.
3. Readjust the FOCUS VR(1) PACK to make both the horizontal and vertical lines of the patterns to be clear.

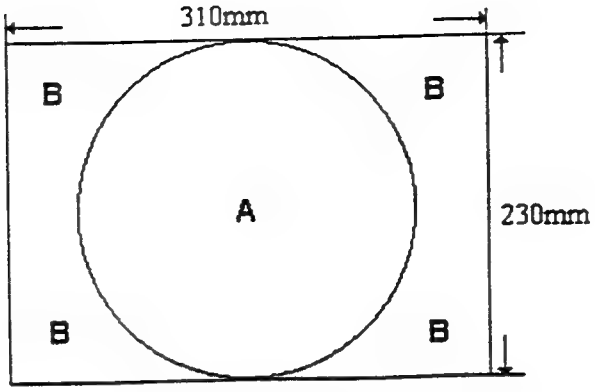
(b) Convergence (CG) Adjustment

Condition: input -

Horizontal frequency	= 60.02kHz;
Vertical frequency	= 75.00Hz;
Resolution	= 1024*768;
Pattern	= letter "H" pattern; cross hatch pattern;

* Before making the following adjustments, please press **Recall** function on OSD Menu to recall the factory preset.

1. Apply the cross hatch pattern and letter "H" pattern to check if the image is clear, especially at the central and the corners.
2. Choose HC (vertical lines convergence) function from OSD Advanced function, then set the scale bar to 50. Adjust VR801 to R, G, and B vertical lines overlapped with white line.
3. Choose VC (horizontal lines convergence) function from OSD Advanced function, then adjust the horizontal central R, G, and B lines overlapped with white line.
4. Adjust VR704 on Control B/D to make upper half horizontal R, G, and B lines overlapped with white line.
5. Adjust VR705 on Control B/D to make horizontal R, G, B lines on the lower half of the video overlapped with white lines.
6. Input the white cross pattern. Adjust the "six pole", located on the CRT magnetic rings, so that the white convergence is within the specifications. Use the CG gauge to check the convergence to ensure that it is in compliance with the specifications (Zone A is less than 0.3mm, Zone B is less than 0.4mm)



Zone A is less than 0.3mm
Zone B is less than 0.4mm

Figure 6.4

Chapter Seven : Spare Parts List

PART_NO	*PART_DESC*	*LOCATION*
BCC17I083S*	CRT 17".26 M41KKA16X	BCCR01
D*BKBL08**G	DIODE BRIDGE : KBL08	BD301
D*D5THZ52*S	DIODE DAMPER : 5THZ52	D108
D*F10DF2**A	DIODE RECOVERY : 10DF2	D107, D115, D119, D201, D416, D517
D*F15DF4**A	DIODE RECOVERY : 15DF4	D504, D508
D*F1SS83**H	DIODE RECOVERY : 1SS83	D410, D412, D414
D*FBA159**B	DIODE RECOVERY : BA159/1A 1KV	D307
D*FFUF5404B	DIODE RECOVERY : FUF5404	D101
D*G1N4002**	GENERAL PURPOSE DIODE 1N4002	D305, D306, D308, D310, D320
D*G1N4148**	DIODE GENERAL PURPOSE : 1N4148	
D*L5N5YGWCK	LED: 5N5YGWCK Y/G (C.C.) 5@	LED801
D*S1N5817*1	DIODE SCHOTTKY 1N5817	D702, D703, D706, D707
D*S1N5820*1	DIODE SCHOTTKY 1N5820	D109
D*UHER103*R	DIODE SUPER FAST HER103	D309
D*UHER108*R	DIODE SUPER FAST HER108 1000V	D506, D520
D*UHER303*R	DIODE SUPER FAST HER303	D318, D319
D*UQ28E200Q	DIODE SUPER FAST BYQ28E-200	D316
D*URL4A***X	DIODE SUPER FAST RL4A 3A 600V	D314, D315
D*ZHZ12A2*H	DIODE ZENER: 11.9V-12.4V 1/2W	ZD101, ZD103, ZD505
D*ZHZ153**H	ZENER DIODE: 14.9V-15.5V 1/2W	ZD304
D*ZHZ182**H	DIODE ZENER: 17.5V-18.3V 1/2W	ZD301, ZD303, ZD501
D*ZHZ5C1**H	DIODE ZENER: 4.9V- 5.1V 1/2W	ZD401
D*ZHZ5C2**H	DIODE ZENER: 5.0V- 5.2V 1/2W	
D*ZHZ7B2**H	DIODE ZENER: 6.9V- 7.2V 1/2W	ZD701
D*ZHZ9C1**H	DIODE ZENER: 8.9V- 9.3V 1/2W	D204, ZD503, ZD705
D*ZY97C160B	DIODE ZENER:153V-171V 1.5W	ZD502
FH****001A*	FUSE CLIPER (5*20mm)	FC301, FC302
HNC502032*A	SIGNAL CABLE 15P-13P 1800mm	HNCH01
IC24LC08B*V	IC 24LC08B/P DIP-8 PIN	IC702
IC24LC21P*V	IC 24LC21/P DIP-8 PIN	IC405
IC4N35T***M	IC 4N35T DIP-6 PIN	ICA2
IC68HC705BM	IC MC68HC705BD3 DIP-40 PIN	IC701A
IC74LS74ANM	IC SN74LS74AN DIP-14 PIN	IC71
IC79L05ACZD	IC LM79L05ACZ TO-92 3 PIN	IC306
ICAN5766K*5	IC AN5766K DIP-22 PIN	IC705
ICAN614***5	IC AN614-(NT) DIP-7 PIN	IC706
ICCS3842A*Y	IC CS3842A DIP-8 PIN	ICA1
ICHA17805*H	IC HA17805 TO-220 3 PIN	IC700
ICLM311N**D	IC LM311N DIP-8 PIN	IC103
ICLM324N**X	IC LM324N DIP-14 PIN	IC708
ICLM358N**D	IC LM358N DIP-8 PIN	IC707
ICLM393N**D	IC LM393N DIP-8 PIN	IC102, IC501
ICLM7812CTD	IC LM7812CT TO-220 3 PIN	IC304
ICLSC4316PM	IC LSC4316P DIP-16 PIN	IC402
ICM52737SPB	IC M52737SP DIP-36 PIN	IC401
ICMC7812CTM	IC MC7812CT TO-220 3 PIN	IC406

PART_NO	PART_DESC	LOCATION
ICNE555N**J	IC NE555N DIP-8 PIN	IC101, IC503
ICTDA9103*J	IC TDA9103-7 DIP-42 PIN	IC704
ICTEA8172*Q	IC TEA8172 DIP-7 PIN	IC201
ICTL082CN*J	IC TL082CN DIP-8 PIN	IC104, IC502
ICTL431CLPM	IC TL431CLP TO-92 3 PIN	ICA3
ICTLP721F*T	IC TLP721F(D4-GR) DIP-4 PIN	IC305
ICUPD6211CN	IC UPD6211CX DIP-20 PIN	IC403, IC703
MP*10130910	BEZEL	MPBE01
Q*2N3904**D	TRANSISTOR 2N3904 (TO-92)	Q1
Q*2N6718LBI	TRANSISTOR H2N6718L-B	Q108, Q114
Q*2SA673ACH	TRANSISTOR 2SA673AC	Q426, Q509, Q709, Q710, QA01
Q*2SA733P*N	TRANSISTOR 2SA733P (TO-92)	
Q*2SA9660*G	TRANSISTOR 2SA966O	Q113, Q135, Q310
Q*2SB857**H	TRANSISTOR 2SB857 (TO-220AB)	Q307
Q*2SC1213CH	TRANSISTOR 2SC1213C (TO-92)	
Q*2SC1921*H	TRANSISTOR 2SC1921(TO-92 MOD)	Q403, Q405, Q407
Q*2SC22360G	TRANSISTOR 2SC2236O (TO-92)	Q134, Q313
Q*2SC2899*H	TRANSISTOR 2SC2899 (TO-126)	Q201
Q*2SC4686AG	TRANSISTOR 2SC4686A	Q711, Q716
Q*2SC5048AG	TRANSISTOR 2SC5048A 4.0-6.5	Q106
Q*2SC5048BG	TRANSISTOR 2SC5048B 5.5-8.0	Q106
Q*2SC945P*N	TRANSISTOR 2SC945P (TO-92)	
Q*2SD1088*G	TRANSISTOR 2SD1088 (TO-220AB)	Q306
Q*2SK1113*G	TRANSISTOR 2SK1113	Q117, Q136, Q137
Q*2SK2485*N	TRANSISTOR 2SK2485	Q506
Q*2SK526**G	TRANSISTOR 2SK526 (TO-220AB)	Q101, Q118, Q119, Q120, Q503
Q*BF422***P	TRANSISTOR BF422	Q138
Q*BF423***G	TRANSISTOR BF423	Q513
Q*BF423***P	TRANSISTOR BF423	Q404, Q406, Q408
Q*FS1018A*B	TRANSISTOR FS10SM-18A TO-3P	Q301
Q*H945P***H	TRANSISTOR H945P (TO-92)	
Q*HPH2369*I	TRANSISTOR HPH2369 (TO-92)	Q411, Q416, Q421
Q*HSA1538EI	TRANSISTOR HSA1538-E (TO-126)	Q413, Q418, Q423
Q*HSC3953EI	TRANSISTOR HSC3953-E (TO-126)	Q410, Q412, Q415, Q417, Q420, Q422
Q*IRF640**A	TRANSISTOR IRF640 (TO-220AB)	Q121
Q*MCR1006*M	TRANSISTOR MCR100-6 TO-92	Q703
Q*SC1213ACH	TRANSISTOR 2SC1213AC (TO-92)	Q71, Q72
TF26V5001LF	X'FMR FBT 26.5KV	T501
XL00000003K	CRYSTAL : 4.000 MHz 20pf	XL700

Appendix

MAG WORLDWIDE SERVICE CENTERS

COUNTRY	*ADDRESS*	*TEL. NO.*	*FAX NO.*
TAIWAN	MAG Technology Co., Ltd. 9F, 245, Tun Hwa South Road, Sec. 1, Taipei	+886-(0)2-7753577	+886-(0)2-7515911
USA	MAG Innovision Inc. 2801 South Yale Street Santa Ana, CA 92704 Internet: http://www.maginnovision.com	Inside California +1-714-7512008 Outside California +1-800-8273998	+1-714-7515522
USA	MAG Technology USA Inc. 2801 South Yale Street, #160 Santa Ana, CA 92704	+1-714-8250980	+1-714-8250979
HOLLAND	Euromag Technology B.V. Valkenierstraat 10B Donkersloot-Noord 2984 AZ Ridderkerk	+31-(0)1804-61211	+31-(0)1804-10648
JAPAN	Magview Co., Ltd. Taisei Bldg. 1-3-4 Osaki Shinagawa-ku Tokyo	+81-(0)3-3493-3588	+81-(0)3-3493-3525
AUSTRALIA	Magtron Monitors Pty. Ltd Unit B2, 1-3 Rodborough Road Frenchs Forest, NSW 2086	+61-(0)2-9975-3727	+61-(0)2-9975-4872

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED

ITEM	PART NO.	DESCRIPTION	QTY.
27	MM*-402-A31-CA	SUB BKT R	1
26	MM*-402-A32-CA	SUB BKT L	1
25	MP*-402-H98-C0	CABLE CLAMP	1
24	LD*-171-27R-*0	DEGAUSSING COIL	1
23	HNC-502-010-*0	SIGNAL CABLE	1
22	A17-DFG-302-07	POWER SW ASSY	1
21	MM*-401-799-10	PLATE COVER	1
20	MP*-301-374-00	PIANO KEY	1
19	MM*-202-261-00	SIDE BKT (R)	1
18	A17-DFG-302-7*	AC SOCKET ASSY	1
17	MP*-301-061-00	REAR COVER	1
16	MP*-401-A39-20	SCREW COVER	2
15	MP*-101-139-3B	HOUSING	1
14	MM*-202-295-00	CRT BD. BOX	1
13	A17-D2T-301-5*	CRT BD ASSY	1
12	MR*-401-859-00	PLASTIC FOOL	4
11	MM*-202-296-00	CRT BD. COVER	1
10	A17-D2T-302-0(	BASE ASSY	1
9	A17-D2T-301-6)	MAIN BD ASSY	1
8	MM*-202-262-0A	REAR PLATE	1
7	MM*-102-333-00	B/P ASSY	1
6	MM*-302-129-0A	SIDE BKT (L)	1
5	BCC-171-083-S*	CRT 17"	1
4	MP*-401-F69-00	LENS	1
3	MP*-101-309-00	BEZEL	1
2	MM*-402-555-0A	SPRING	1
1	MP*-401-768-20	POWER KNOB	1

APPLICATION

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

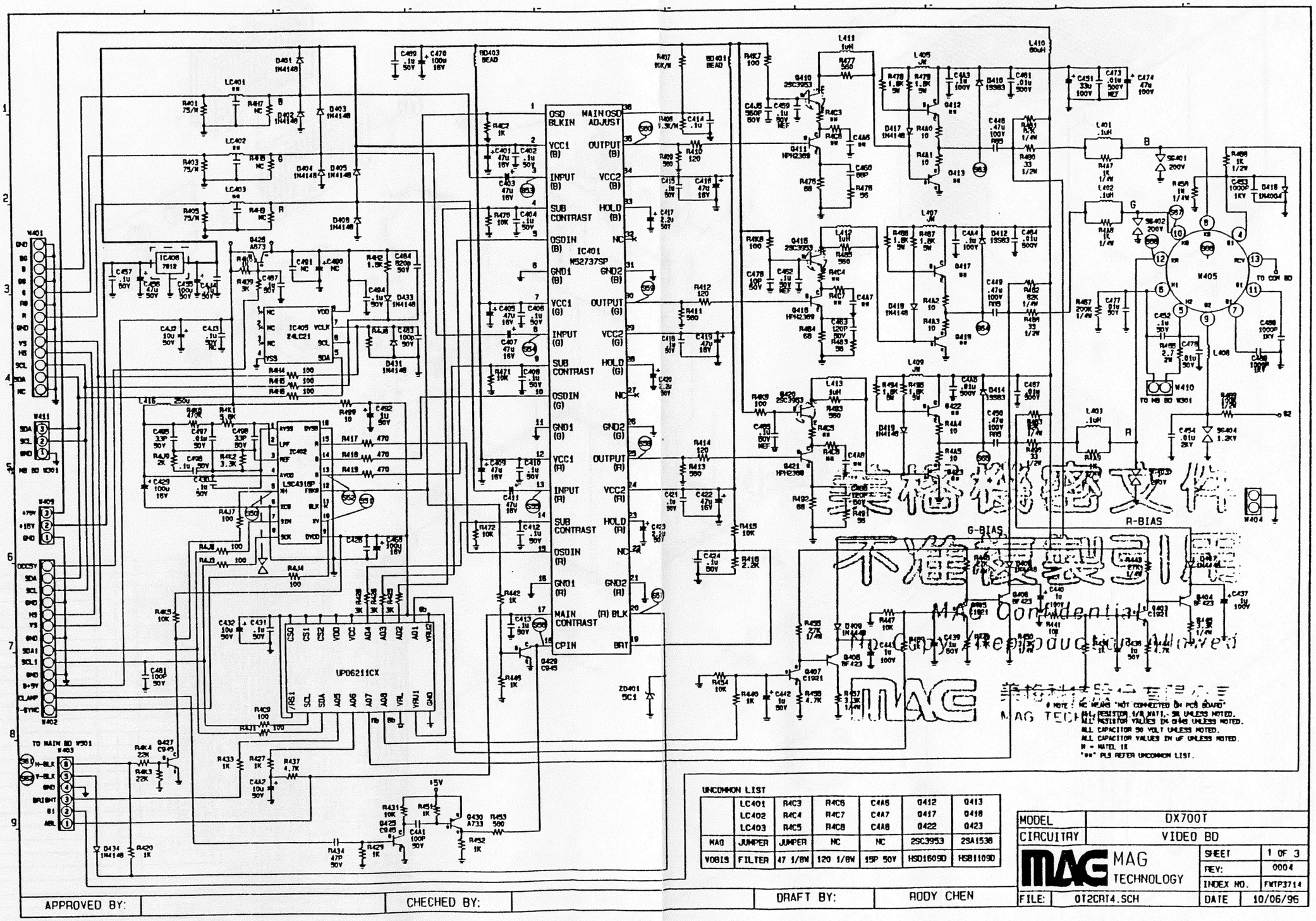
NAME: EXPLODE DRAWING

PART: FM1P1033

DATE: 94-03-04 SCALE: DWG BY Fy APPROVED

MAG TECHNOLOGY CO.,LTD.

PAGE: SHEET: OF DX17C-A21F 2



NOTE

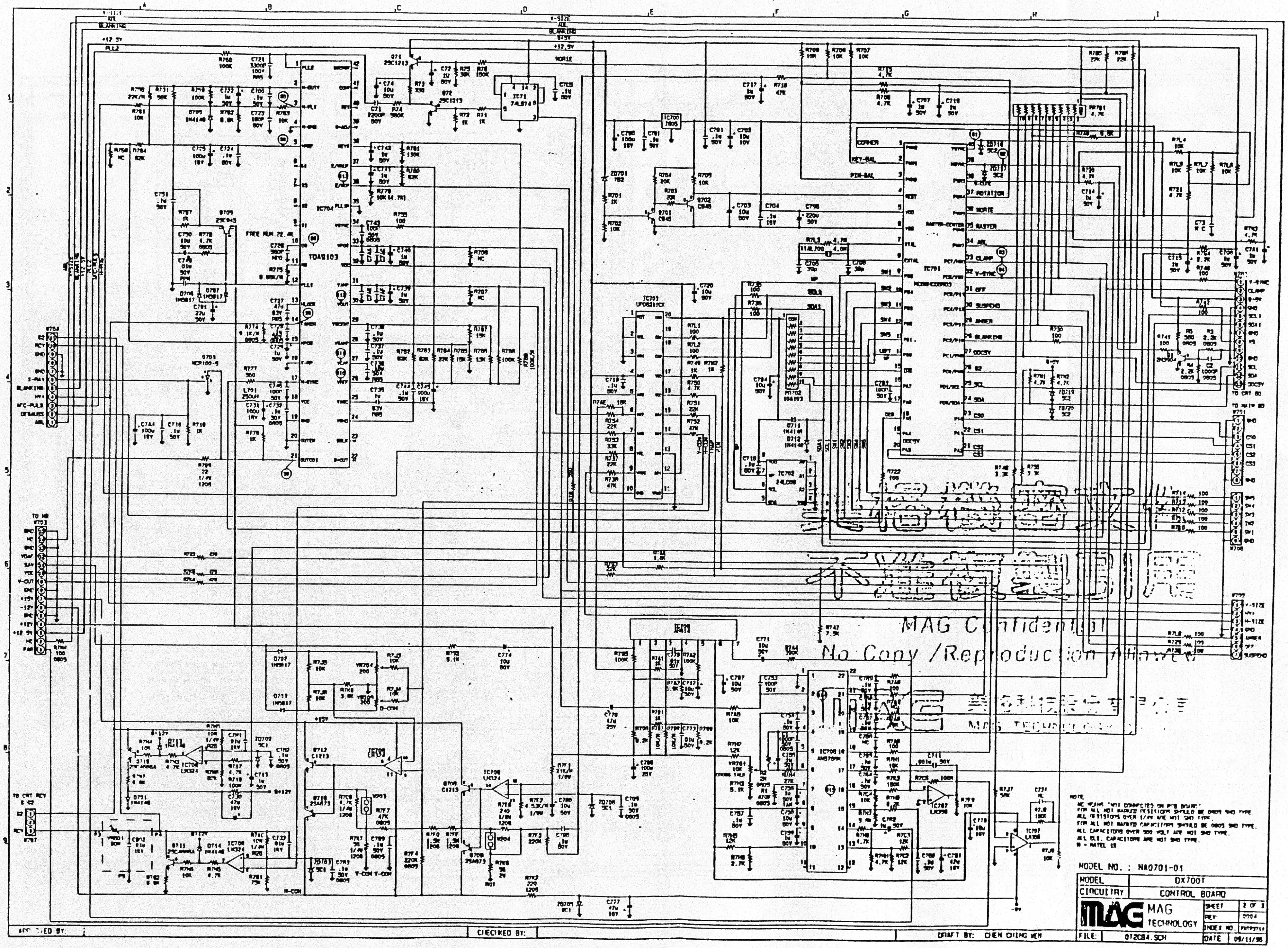
NC MEANS "NOT CONNECTED ON PCB BOARD"
ALL RESISTOR 1/8 WATT, 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITOR 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN uF UNLESS NOTED.
K = WATT 1K
"**" PLS REFER UNCOMMON LIST.

UNCOMMON LIST

	LC401 LC402 LC403	R4C3 R4C4 R4C5	R4C6 R4C7 R4C8	C4A6 C4A7 C4A8	Q412 Q417 Q422	Q413 Q418 Q423
MAG	JUMPER	JUMPER	NC	NC	2SC3953	2SA1538
VOBIS	FILTER	47 1/8W	120 1/8W	15P 50V	HSD1609D	HSB1109D

MODEL	DX700T		
CIRCUITRY	VIDEO BD		
MAG TECHNOLOGY	SHEET	1 OF 3	
	REV:	0004	
	INDEX NO.	FMTP3714	
FILE: 0I2CRT4.SCH	DATE	10/06/96	

APPROVED BY: | CHECHED BY: | DRAFT BY: RODY CHEN


TDA9103
MC68HC05R03
UPD6311CX
AN5782K
MAG Confidential
No Copy / Reproduction Allowed
MODEL NO. : NA0701-01
MODEL DX700T
CIRCUITRY CONTROL BOARD
MAG TECHNOLOGY
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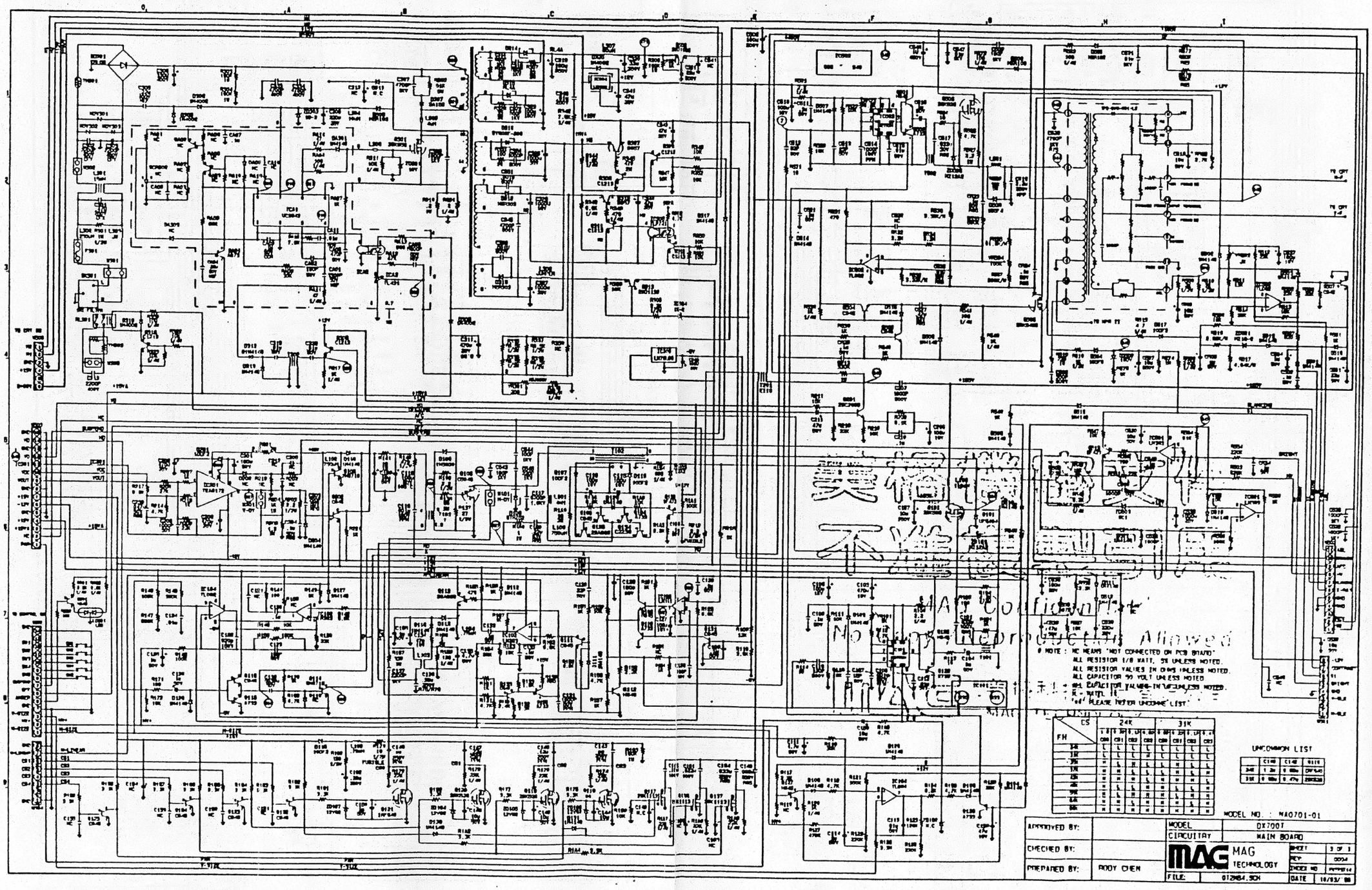
FILE: 012C84.SCH
DATE 09/11/96
DRAFT BY: CHEN CHING WEN
CHECKED BY:


NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"
ALL RESISTOR 1/8 WATT, 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITOR 50 VOLT UNLESS NOTED
ALL CAPACITOR VALUES IN MFD UNLESS NOTED.
ALL WATT 1/4
PLEASE REFER UNCOMMON LIST
UNCOMMON LIST
APPROVED BY:
CHECHED BY:
PREPARED BY:
ROGY CHEN
MODEL NO. : MA0701-01
MODEL
DX700T
CIRCUITRY
MAIN BOARD
MAG TECHNOLOGY
FILE:
DATE